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THE ANNUAL REPORT OF THE SCHOOLHOUSE DEPARTMENT

FROM FEBRUARY 1, 1906, TO
FEBRUARY 1, 1907.

BOSTON
MUNICIPAL PRINTING OFFICE
1907

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Boston. Schoolhouse Department
June 19, 1907

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BUILDINGS IN CHARGE OF SCHOOLHOUSE DEPARTMENT.

Number of Permanent School Buildings in charge of this Department	224
Of the above, there are in use as storehouses, etc. . .	3
Number of Portable Buildings	92
Number of Hired Buildings	18
Giving Class-rooms to the number of	32
Number of New Buildings finished by Commission (including Addition to Francis Parkman Schoolhouse) . .	22
Number of Buildings under construction at the present time	5

REPORT OF THE COMMISSIONERS.

Hon. John F. Fitzgerald,
Mayor of the City of Boston:

Dear Sir, — In accordance with the provisions of chapter 473 of the Acts of 1901, the Board of Schoolhouse Commissioners submits herewith its fifth annual report, covering the period from February 1, 1906, to February 1, 1907.

I.

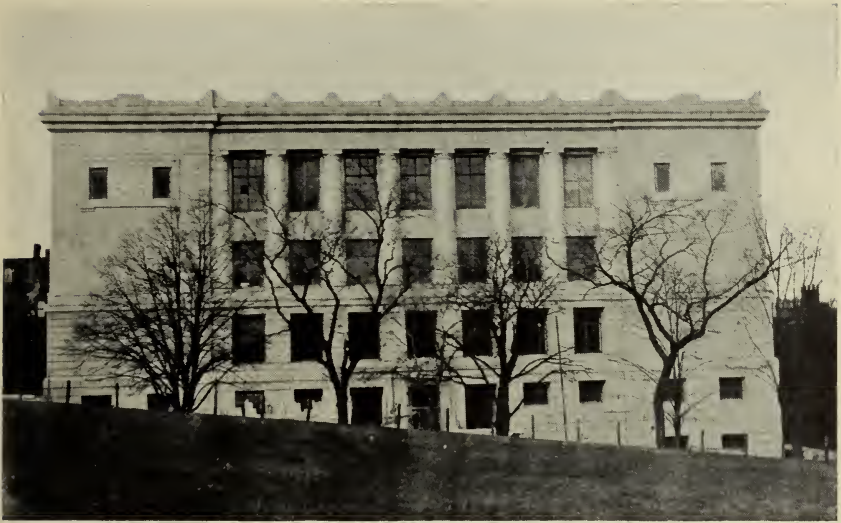
POWERS OF THE BOARD.

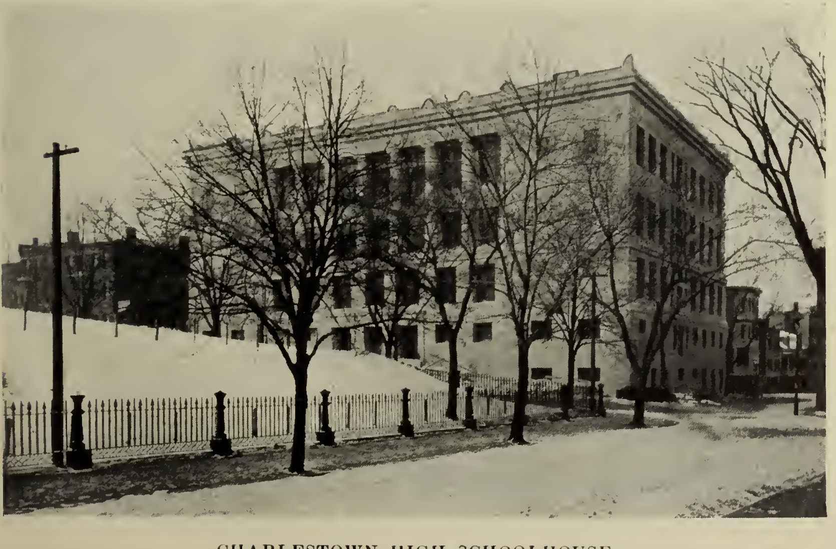
The powers of the Board have already been defined in the last report to your Honor, covering the period from February 1, 1905, to February 1, 1906. It would seem proper, however, at this time to call to your attention the severe limitations that are placed upon the powers of this Board by the lack of permanent provisions for new buildings. Where the work can be planned only from year to year, it is impossible to lay down a reasonable policy with any assurance that it can be carried out. Other large cities, without exception, that are pursuing a modern policy in regard to their school equipment, provide regularly and liberally for the new school buildings necessary to meet the growing demands of the population and to replace buildings that are out of date. The City of New York, with a population of 3,888,180, has spent on an average $8,000,000 annually for the last five years. The City of Chicago, with a population of 1,932,315, has spent on an average $1,800,000 for the past five years, and St. Louis, with a population of 624,626, has during the past five years fixed its school appropriation at $3.30 per each $1,000 of assessed valuation, and of this amount it has averaged $860,000 per year for new buildings and $637,500 per year for repairs. The Board believe they could do their work with $500,000 a year if only this amount were permanently assured.

Of the three cities quoted, St. Louis is perhaps the most apt comparison, because it is nearest in size to Boston. Boston has at present no regular yearly appropriation that can be definitely counted upon. In the past five years, since this Board was established, it has depended on the loans authorized by the Legislature. After the first loan, which extended over three years, was expended, there has never been a time when the Board could look ahead twelve months and know what funds would be at its disposal; and at present there is no provision for the future. It is needless to do more than point out how seriously the powers of the Board are hampered, when they cannot plan for work in advance. Almost equally limiting have been the circumstances governing the power of the Board in maintaining in proper condition of repair the old buildings, many of which require repairs far in excess of what might ordinarily be called wear and tear, and the new buildings, which require a constant expenditure to keep them in first-class condition.

When the Board was first established the repair work had been done, if done at all, with very little system, and the majority of the old buildings demanded substantial renewals of the exterior before interior repairs could be justified. In 1901 there was but a half year from the establishment of the Board on the first of June until the first of February, 1902. The first full year, therefore, was covered by the period from February 1, 1902, to February 1, 1903. This year the sum of $277,059.81 was expended for legitimate renewals and repairs. The major heating repairs, affecting the sanitary condition of the schools, heating and plumbing, were all taken care of out of the loan for Land and Buildings for Schools.

In the year from February 1, 1903, to February 1, 1904, the sum of $285,959.36 was expended for repairs. In both this year and the year preceding a large proportion of this amount was spent upon the old buildings, making the exterior sound and tight, major repairs to roofs and to walls, thus





CHARLESTOWN HIGH SCHOOLHOUSE,
Boston, Mass.
STICKNEY & AUSTIN, Architects.

preparing the way for the major interior repairs to plastering, to painted surfaces and to floors.

The first building erected by the Board was completed August 7, 1903. Not until this time, therefore, was any money needed for repairs of the new buildings, but from this time on the new buildings followed each other in rapid succession, each building adding to the burden placed upon the repair account. With this added burden to face the amount expended for repairs for the year from February 1, 1904, to February 1, 1905, was $284,664.62. This year, for the first time, in accordance with chapter 376 of the Acts of 1904, carried through by the School Committee in spite of the protests of the Board of Schoolhouse Commissioners and the opposition of the Mayor, such portion of the expense of administration of the Board of Schoolhouse Commissioners as was not chargeable against the appropriation for Land and Buildings for Schools, was made payable by the Board of Schoolhouse Commissioners instead of by the School Committee, and consequently was an additional charge against the appropriation for repairs. On this account therefore the amount expended this year was just below that expended in the year 1903–1904, although nine schools had been completed since the first one was finished on August 7, 1903, and before the beginning of the school year in 1904, and the maintenance of these additional schools, representing an investment of $1,965,666.07, was chargeable against this same fund.

The erection of new buildings had materially lessened the rentals, which was a relief to the School Committee, but none whatsoever to this Board. For the year 1905–1906 there was expended for repairs the sum of $283,262.26, a sum slightly below that for either of the previous years, and yet at the opening of the school year, September, 1905, nineteen new buildings had been completed, representing an investment of $3,729,284.63.

Finally, in the present year, February 1, 1906, to February 1, 1907, there was expended for repairs the sum of $239,987.68, an amount $40,000 less than that available in 1902, when none of the buildings erected by this Board were complete. This year out of our repair appropriation of twenty-five cents assessment on each $1,000 of assessed valuation, by special act of the Legislature, the School Committee were empowered to take a sum amounting to $60,000 for the payment of teachers' salaries, of which $15,000 was later returned.

Under such circumstances as these the powers of the Board are very seriously curtailed. Nor, with the inability of the Board to carry any balances on the repair account that might be saved from year to year, is there any possibility of putting aside a sum which shall be available for such emergencies as repairing the Lewis School, which was damaged by fire, or meeting any extraordinary charge which might suddenly be placed upon this account.

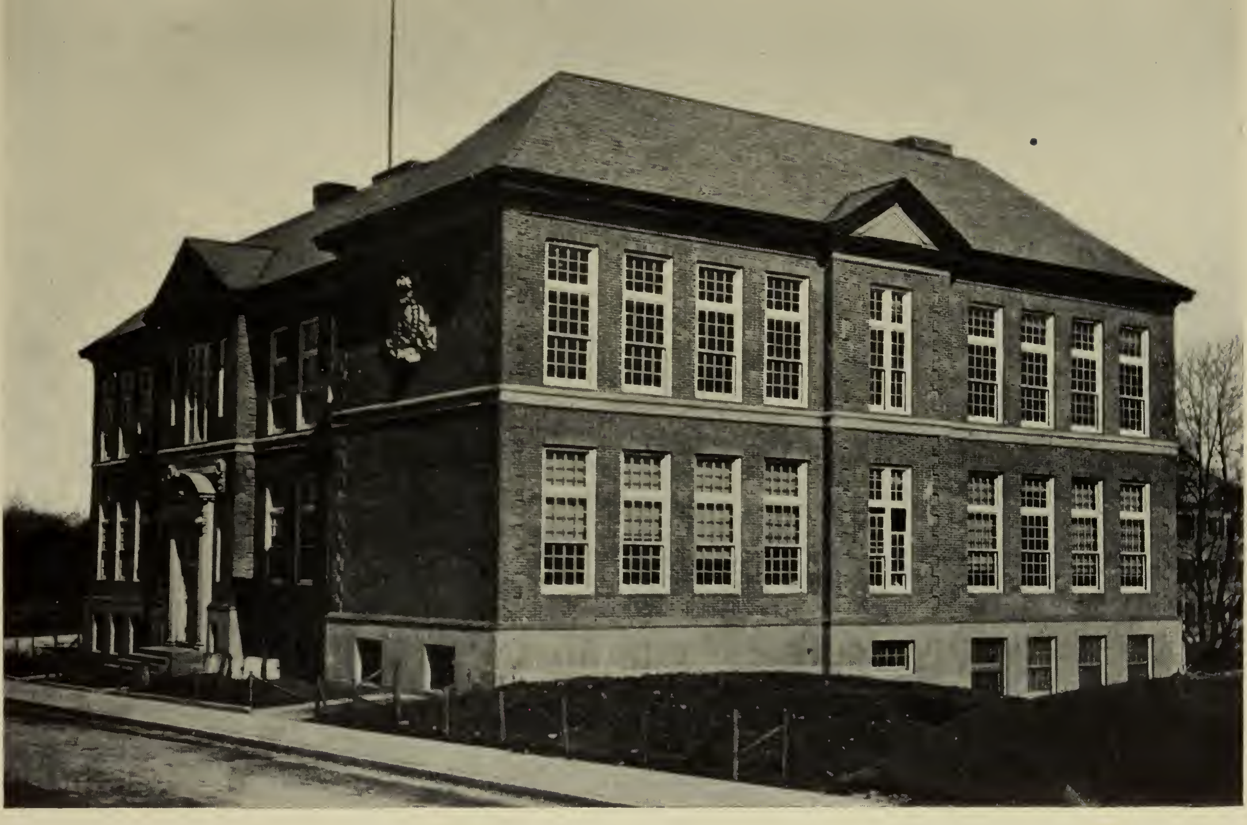
Major repairs for the large older schools will often run to a very serious amount. The new heating plant installed in the Girls' High School a few years ago amounted to $40,573.94 and at the same time certain sanitation was installed amounting to $13,685.33, in all a total of $54,259.27, and the plumbing done the same year in the English High and Latin Schools amounted to $65,684.14. Fortunately both of these were at that time chargeable to the appropriation for Land and Buildings for Schools, but in future such large renewals must necessarily come upon the appropriation for repairs.

The following table shows the yearly appropriation voted by the School Committee for the years 1902–1907 together with expenditures:

STATEMENT SHOWING AMOUNT OF MONEY VOTED BY SCHOOL COMMITTEE AND EXPENDED BY SCHOOLHOUSE DEPARTMENT TOGETHER WITH ASSESSED VALUATION OF LAND AND BUILDINGS FOR YEARS 1902–1907.

	1902-1903.	1903-1904.	1904-1905.	1905-1906.	1906-1907.
Expended for repairs,	$277,059 81	$285,959 36	$284,664 62	$283,262 26	$239,987 68
Expended for rentals,	53,195 59	53,889 88	48,002 98	29,383 05	25,580 27
Expenses of administration	36,544 60	24,283 76	24,638 13	24,054 69	22,532 05
Transferred to School Committee	....	....	12,694 27	....	....
Total appropriation voted by School Committee	$366,800 00	$364,133 00	$370,000 00	$336,700 00	$288,100 00
Value of land	$4,196,500 00	$4,318,300 00	$4,402,400 00	$4,598,000 00	$4,706,800 00
Value of buildings	8,914,200 00	9,155,400 00	10,136,400 00	11,200,300 00	12,075,200 00
Total valuation	$13,110,700 00	$13,473,700 00	$14,538,800 00	$15,798,300 00	$16,782,000 00

As far as the powers of the Board, therefore, are concerned, it is essential that they should be made secure for a



WILLIAM E. ENDICOTT PRIMARY SCHOOLHOUSE,
Dorchester.
JAMES E. McLAUGHLIN, Architect.

series of years, so that the work may be properly planned ahead, and the amount set aside from repairs should not only not be appropriated for any other purpose, but the surplus each year, whenever it is possible to provide a surplus, should be carried to the next year's account, so that there might be some reserve fund.

The bill presented to the Legislature this year by the School Committee with the endorsement of your Honor will, if passed, make proper provision for the fund for new buildings in the future.

II.

WORK EXECUTED UNDER THE APPROPRIATION FOR LAND AND BUILDINGS FOR SCHOOLS.

The work done thus far by the Board will be considered under five heads:

1. Report of progress on buildings described last year, and on the new buildings undertaken since then.
2. Limit of cost for school construction, elementary and high, in the City of Boston.
3. Future accommodation.
4. Report on sanitation installed.
5. Report on fire protection.

(1.) REPORT OF PROGRESS ON BUILDINGS DESCRIBED LAST YEAR AND ON NEW BUILDINGS UNDERTAKEN SINCE THEN.

(*a.*) *The William E. Endicott School.* The William E. Endicott School, reported last year, was finally certified as being practically complete on December 4, 1905, and was occupied for school purposes on March 14, 1906. The completed cost compares with the original contract price as follows:

	Original contract.	Complete contract.
General contract . . .	$68,900 00	$64,745 25
Heating contract . . .	7,973 00	7,951 00
Plumbing contract . . .	3,657 00	3,657 91
Electrical contract . . .	2,829 00	2,693 61
	$83,359 00	$79,057 77

As a ten-room primary building the Board's standards set the cost of this building at $77,000, which would mean

350,000 cubic foot, at 22 cents per cubic foot, or $154 per pupil. The final figures represent 348,883 cubic feet at 22.6 cents per cubic foot and $158.11 per pupil.

(*b*) *The Nathaniel Hawthorne School.* The Nathaniel Hawthorne School, reported on last year, was certified as being practically complete on December 26, 1905, and was occupied for school purposes on May 7, 1906. The completed cost compares with the original contract price as follows:

	Original contract.	Complete contract.
General contract . . .	$55,862 00	$54,682 82
Heating contract . . .	7,527 00	7,518 00
Plumbing contract . . .	3,100 00	3,100 00
Electric contract . . .	2,691 00	2,611 25
	$69,180 00	$67,912 07

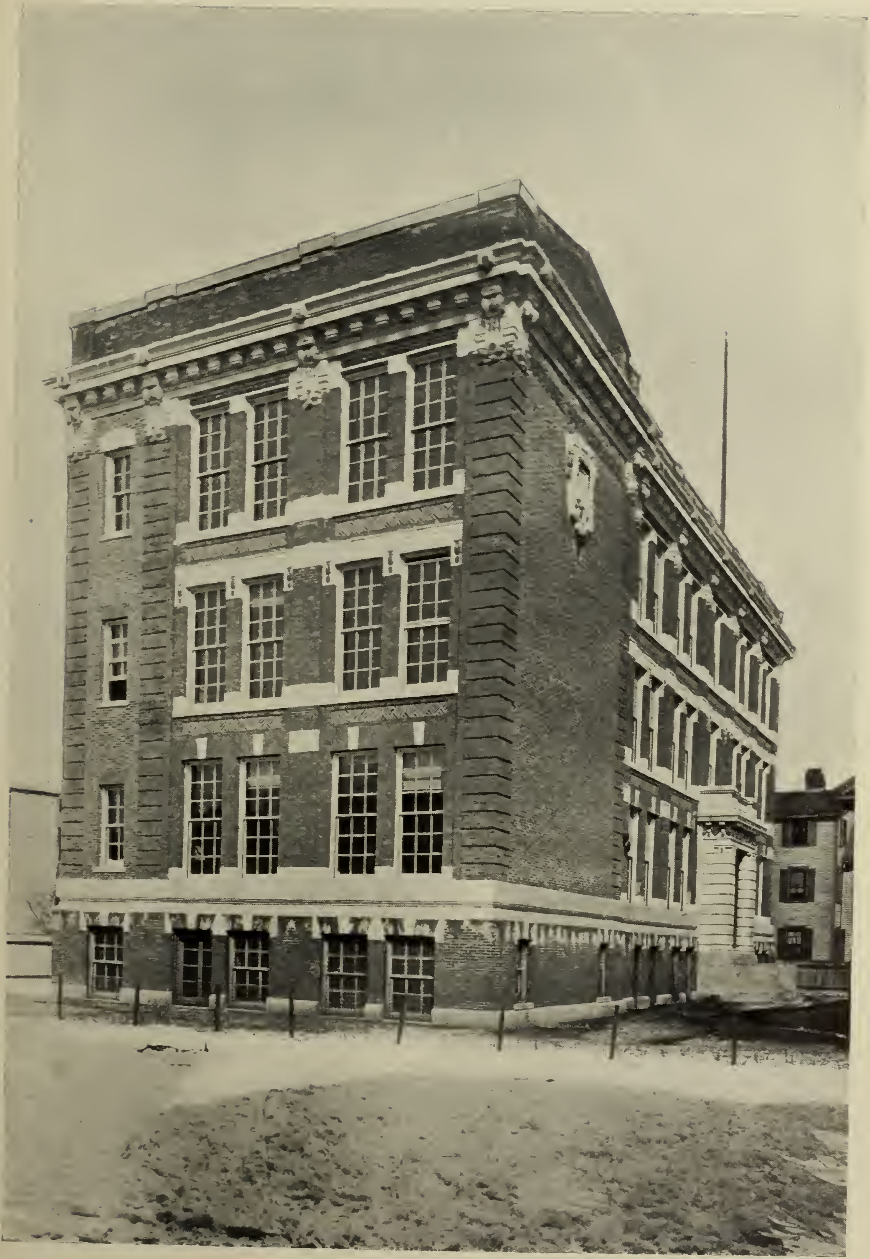
As a nine-room primary building the Board's standards set the cost of this building at $69,300, which would mean 315,000 cubic feet, at 22 cents per cubic foot, or $154 per pupil. The final figures represent 281,305 cubic feet at 24 cents per cubic foot, and $150.91 per pupil.

(*c.*) *The Charlestown High School.* The Charlestown High School, reported last year, included two bids, that for granite, accepted September 12, 1905, for $67,000, and that for the general contract, which was not awarded until January 8, 1906. The original contracts were reduced at the time of signature by $11,510.70, so that the reduced amount, $294,626.30, really represents the contract price when the building was let. The figures to date as compared with the original contract are as follows:

	Original contract.	Amount of contract to date
General contract . . .	$239,137 00	$226,754 35
Granite contract . . .	67,000 00	66,893 00
	$306,137 00	$293,647 35

The building is not yet complete, but it is due to be complete on March 8, 1907.

(*d.*) *The Normal and Girls' Latin Group.* The Normal and Girls' Latin Group, reported last year as being on the drawing boards, was advertised on March 8, 1906, and bids were opened on March 29, 1906. The lowest bidder was the George A. Fuller Company, to the amount of $663,980.



NATHANIEL HAWTHORNE PRIMARY SCHOOLHOUSE,

Roxbury.

W. H. McGinty, Architect.

In view of the cost of this group of buildings and the small amount that would be left in the fund for Land and Buildings for Schools, evidently quite insufficient to complete the Mechanic Arts High School, the Board, after consultation with Your Honor, decided to omit the superstructure of the Model School and make various changes reducing the cost of the exterior and, after having the figures for these changes and omissions carefully checked by the architects, the contract was signed April 7, 1906, at the original figure, with an accompanying order of deduction for $135,106; the contract, as signed, was practically therefore $528,874, and represented the Normal School, the Girls' Latin School and the Common Building, but with the Model School having only the foundations put in and this protected with a temporary roof. This group of buildings was let in four contracts and when the general contract was let the plumbing had been figured, but the heating and electric work had not. A deduction was made from the plumbing contract in the same way as the deduction was made on the general contract, so that this contract, less the work for the Model School, was $24,762. The heating and electric work were revised before bids were opened. The contracts as awarded were therefore:

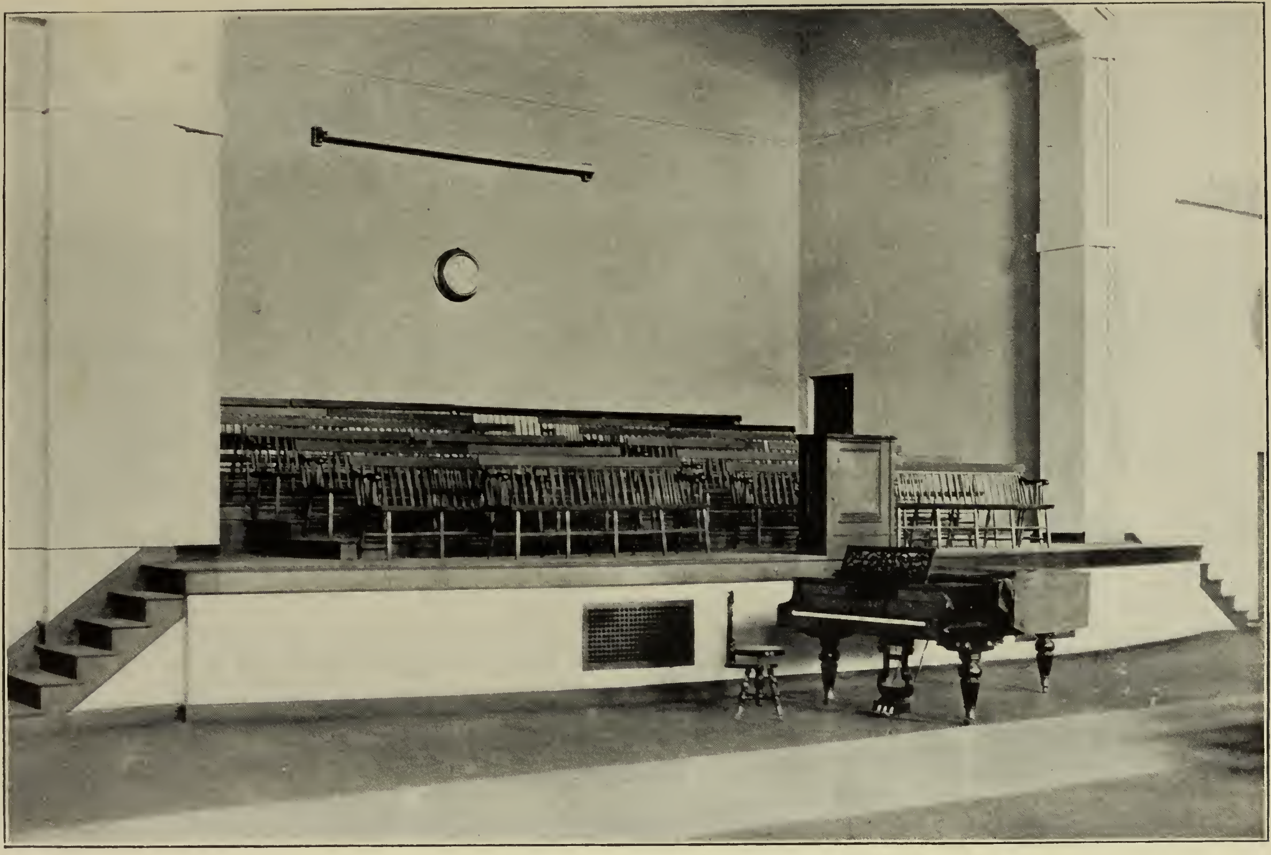
General contract	$528,874 00
Heating contract	45,882 00
Plumbing contract	24,762 00
Electric contract	20,360 00
Total for the group	$619,878 00

On November 5, 1906, it was voted by the School Committee to complete the Model School, so that it might be used as temporary quarters for the High School of Commerce. Various circumstances made it impossible to replace the work originally included in the contract for building and for plumbing for the same price as was allowed when it was omitted. The figures, however, were very carefully checked, and the architects and this Board were fully convinced that those submitted by the contractors on this work represented fairly the market value of the work which was thus incorporated in the group. With the heating and electric work there had been no deduction, but the Board had the original approximate estimates, and the slight amount in excess of these, which was figured by the contractors for the heating and electric work, represented reasonably in the judgment of the Board and of its architects and engineers the increase of cost in labor and material. The final figures to date for the complete group are as follows:

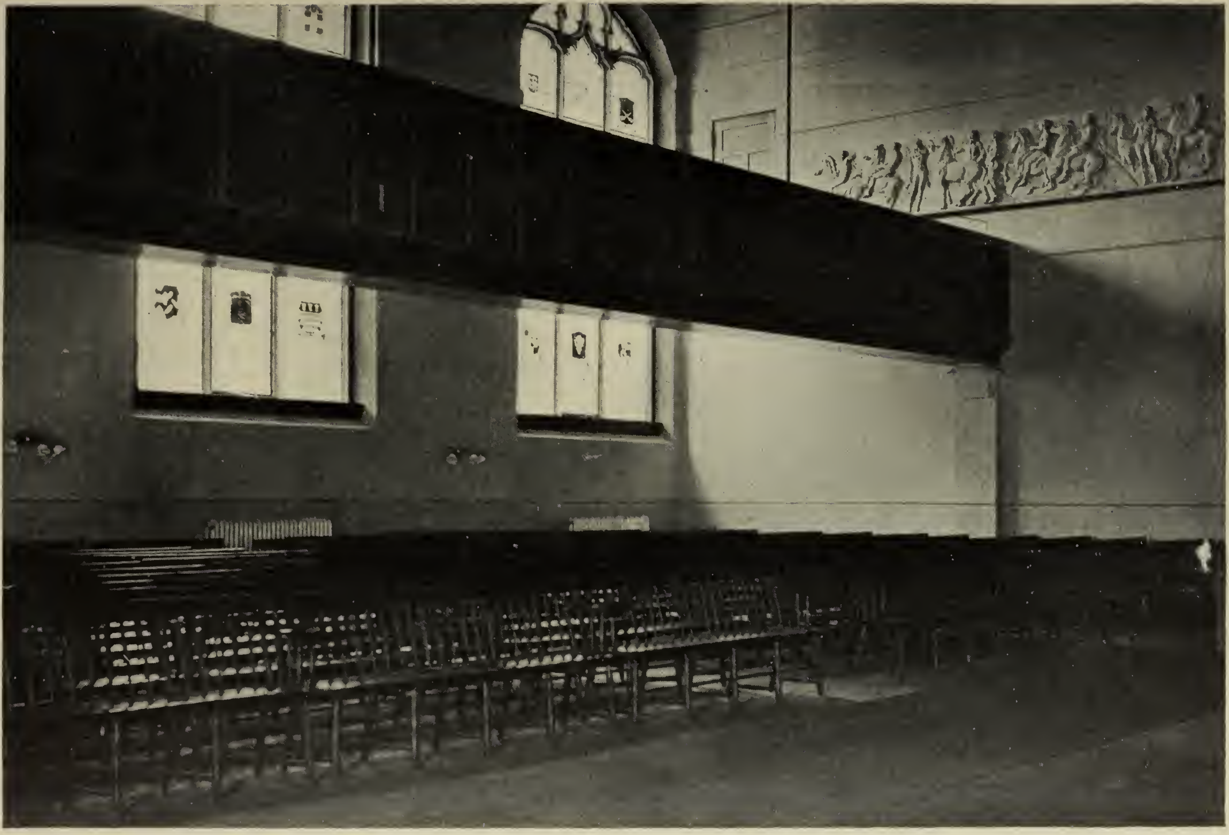
General contract	$661,854 85
Heating contract	60,695 85
Plumbing contract	30,605 00
Electric contract	27,692 00
	$780,847 70

If the original contracts had been accepted the city would have saved about $30,000. The addition to the Mechanic Arts High School, for the benefit of which this sacrifice was made, the Board found themselves unable to erect, owing to the excessive amount of the estimates for this work.

(*e.*) *The Mechanic Arts High School.* The addition to the Mechanic Arts High School, which has been reported upon annually for the last four years, is still delayed. When the contract for the Normal and Latin Group was let without the Model building, there remained a balance of $452,872.61 in the fund for Land and Buildings for Schools. No appropriation had been made by the School Committee out of the forty cents for new buildings, and no permission had been asked of the Legislature to borrow. There was, therefore, no prospect of any addition to this amount. When the bids were opened it was found that this building, for which the Board had originally contemplated expending at the outside about $300,000, would run, in the condition of the market at that time, and with the various additions that had become embodied in the plans to meet what appeared to be the legitimate demands of the work, to an amount rising $400,000. Moreover, it was now about twelve months since the last of the elementary schools was put in hand, April 26, 1905, and from that date no new work had been begun to take care of the constantly pressing demands of the elementary schools. Not only were there legitimate demands upon the fund for accommodation for the elementary schools, but there were very pressing high school needs, especially the newly established High School of Commerce and the crowded Dorchester and Roxbury districts. Under these circumstances it seemed not only inadvisable to attempt the completion of the Mechanic Arts High School, but practically impossible, as the Board had not funds enough at its disposal to finish and furnish the buildings already under way, and also complete this addition. The work was therefore again postponed.



STAGE IN HALL, MATHER GRAMMAR SCHOOLHOUSE,
Meeting House Hill.
CRAM, GOODHUE & FERGUSON, Architects.



HALL, MATHER GRAMMAR SCHOOLHOUSE,
Meeting House Hill.
Cram, Goodhue & Ferguson, Architects.

(*f.*) *The Dorchester High Annex.* As reported last year, the Dorchester High, although so new a building, has been seriously crowded ever since its occupation in 1901. The Board had contemplated relieving the situation here by building class-rooms on an adjacent lot, and thus utilizing the existing plant of the Dorchester High for the four or five hundred children that would find desk accommodation in the Annex. In view of the desirability of restudying the whole of the suburban high school question, this matter was delayed, but the working drawings are practically complete. The superintendent and the School Committee now have this whole subject in hand, but have not yet made a report.

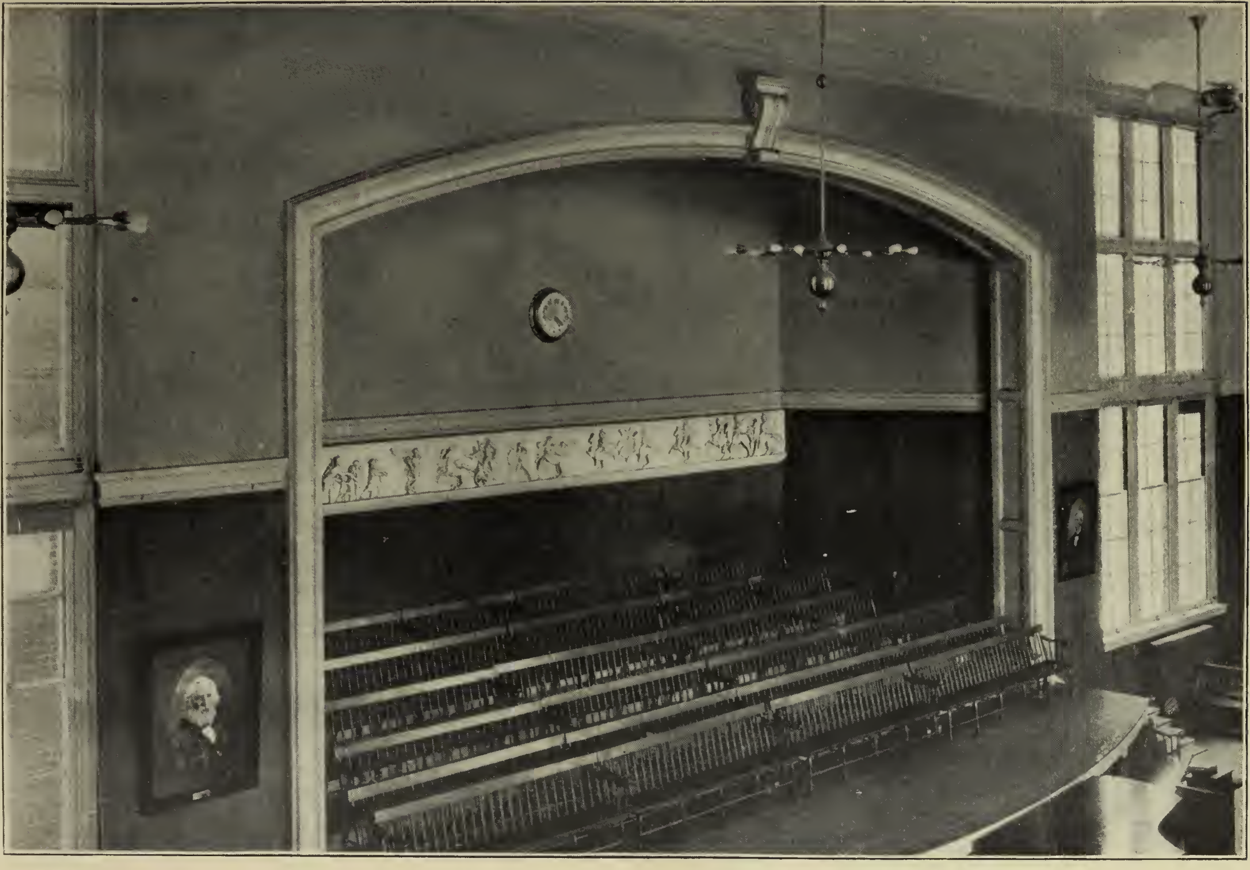
(*g.*) *The Edward Everett District Grammar School.* As reported last year the new grammar school in this district seemed to the Board imperative, and the Board had advertised, had selected a lot, and had received the opinion of the Superintendent of Schools, confirming this lot. With the beginning of the new year, with a new School Committee and a new superintendent, it was deemed desirable to withhold action on this matter. The district has been inspected by Your Honor and has been gone over by the Superintendent of Schools, Mr. Stratton D. Brooks; repeated hearings have been given to residents of this district who desire more especially accommodation for the children living at the Savin Hill end, with the result that this Board, the School Committee and the Superintendent are convinced that additional accommodation is required at the Savin Hill end in addition to the proposed new grammar school, and the School Committee voted accordingly on January 7, 1907, asking for such accommodation. The Board have advertised accordingly, and have under consideration offers of land beyond the railroad tracks in Savin Hill, as well as the offers that have been previously made for land for the grammar school. After careful consideration of this matter, the Board finally decided in favor of a lot located on Pleasant street, which though not in every respect ideal, seemed on the whole best suited to the needs of the district at large. Last summer when this matter was considered practically settled, Mr. Edward T. P. Graham was appointed architect, and as soon as this land is taken will proceed at once with the drawings for the new school.

(*h.*) *The High School of Commerce.* On June 13, 1905, by vote of the School Committee, the High School of Commerce was established, and on April 17, 1906, the Board was requested to equip the old Winthrop Street Schoolhouse as temporary quarters for the school, which was to begin its sessions Sepember, 1906. This building was prepared in a very simple way for the work. It is a primary building, in not very good condition, and with no proper sanitary arrangements for the pupils. As a considerable number of children were attending the school the first year, it was evident that larger and more suitable quarters ought to be prepared for them before the opening of the term in September, 1907. The School Committee therefore ordered, November 5, 1906, the completion of the Model School, so that this might be temporarily used for the High School of Commerce. To fit it for this purpose the rooms in the basement, allotted to cooking and manual training, will have the equipment temporarily omitted, and these rooms and the playrooms will be changed so as to provide a physical and chemical laboratory, a lecture-room, and a lunch-room. Otherwise the building will remain unaltered, so that the Board will not be put to any unnecessary expense when it is occupied eventually for its legitimate purpose. On the same date as above, the School Committee located the High School of Commerce permanently in the Lewis District. The Board advertised for land January 19, 1907.

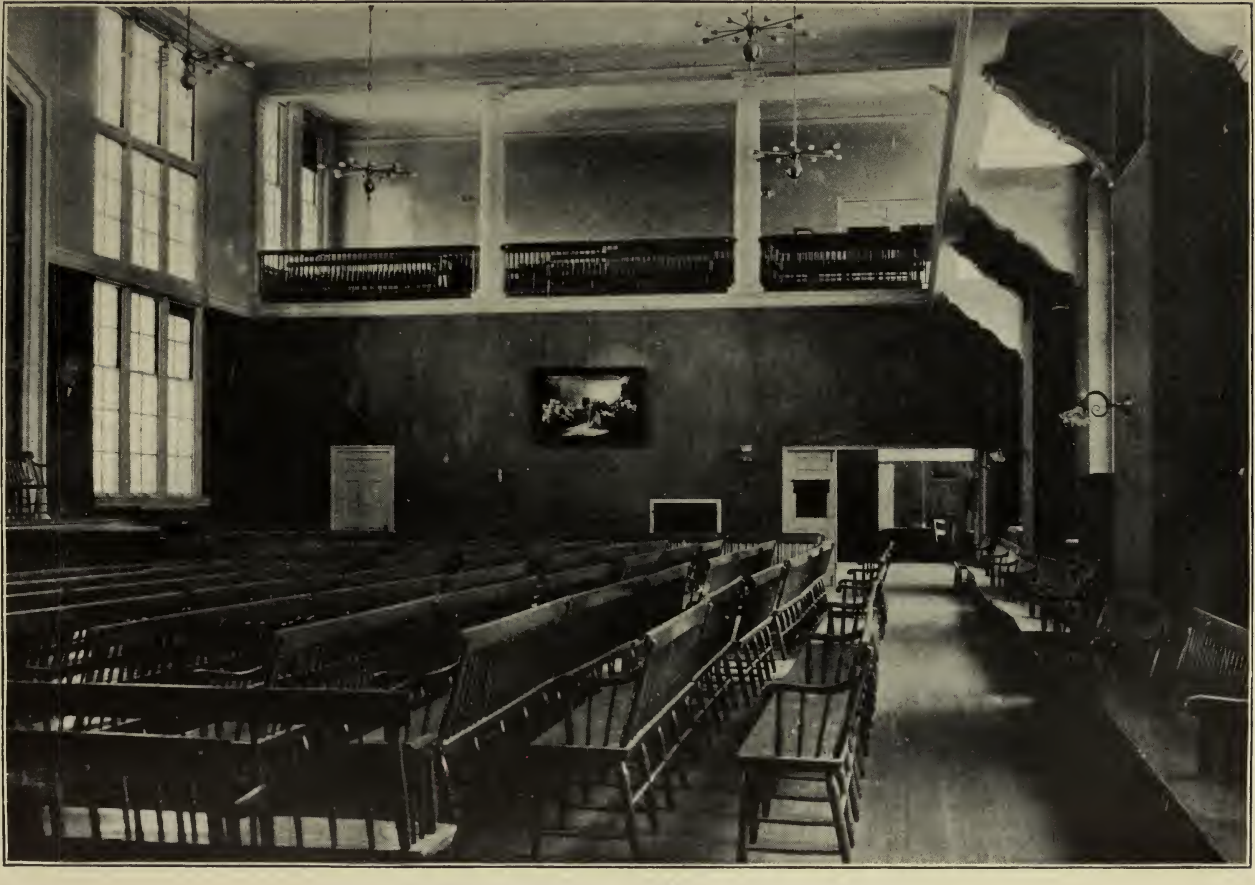
(*i.*) *The Francis Parkman School.* The Francis Parkmen end of the Agassiz District was set apart as a separate grammar district by vote of the School Committee on December 26, 1905. No action was taken confirmatory of this division of the district by the new School Committee, but in view of the growing needs of the neighborhood, developing during the last school term, the Board decided to proceed with this item. On December 20, 1906, Mr. C. B. Perkins, the architect of the present Francis Parkman building, was appointed architect for the addition and the Board have the preliminary drawings under advisement.

(2.) LIMIT OF COST FOR SCHOOL CONSTRUCTION, ELEMENTARY AND HIGH, IN THE CITY OF BOSTON.

The schools without assembly halls or manual training and cooking rooms, which have been previously called primary schools, are now grouped with those which have complete equipment for the higher elementary education as elementary schools. These two classes of buildings would remain in the cost of accommodation practically as laid down in the previous report, namely, that small elementary schools, containing 10 to 14 rooms, would be allowed 35,000 cubic feet per room and 22 cents per cubic foot, and that the large elementary schools of over 20 rooms should not exceed



STAGE IN HALL, OLIVER WENDELL HOLMES GRAMMAR SCHOOLHOUSE,
Dorchester.
A. W. LONGFELLOW, Architect.



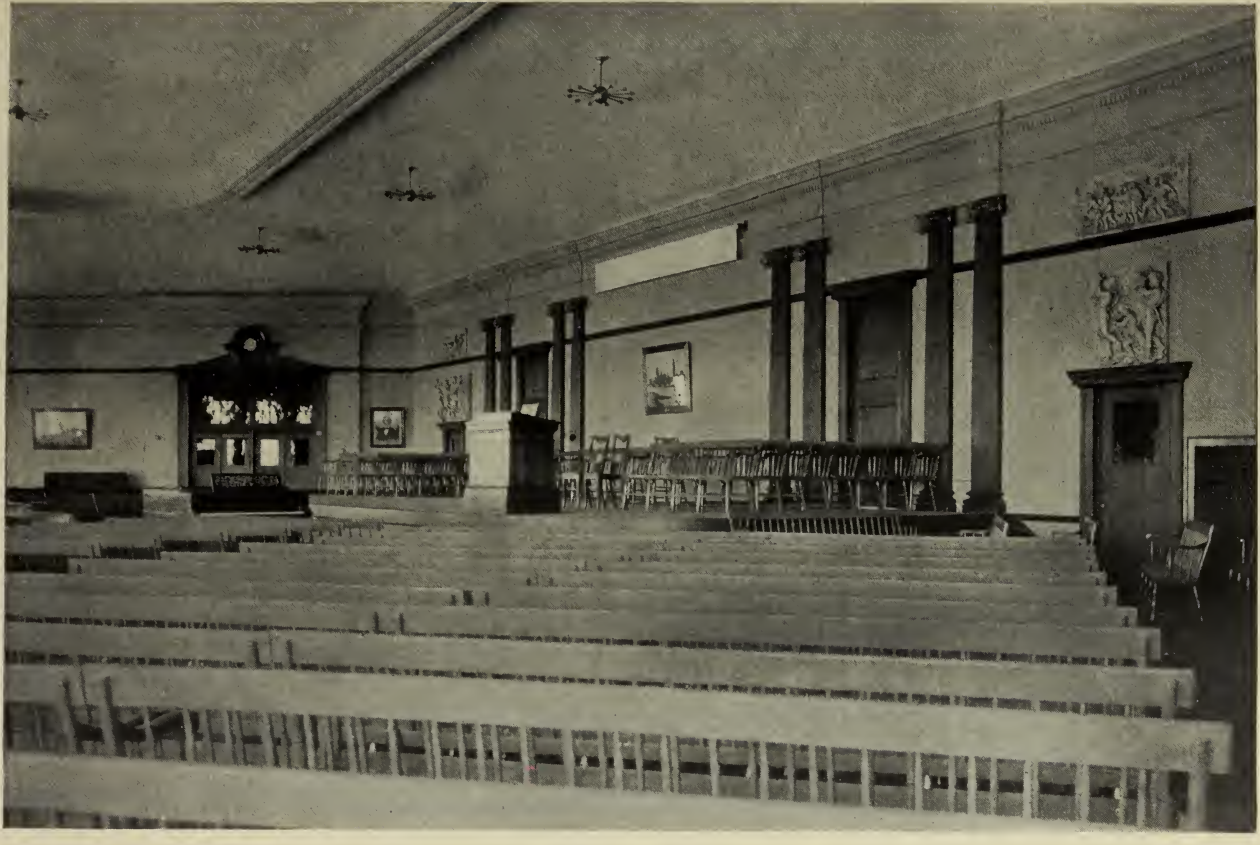
HALL, OLIVER WENDELL HOLMES GRAMMAR SCHOOL,
Dorchester.
A. W. LONGFELLOW, Architect.

30,000 cubic feet per class-room and 22 cents per cubic foot; and that with the higher elementary schools the number of cubic feet allowed per class-room would vary from 48,000, allowed for a twelve-room building, to 40,000 allowed for a twenty-room building, and the price per cubic foot, as before, 22 cents. For High Schools, from 82,000 cubic feet for a large building to 66,000 cubic feet for a small one, per class-room of forty pupils; and 24 cents per cubic foot. To arrive at the number of class-rooms with 40 pupils, take the total seating capacity of class and recitation rooms and divide by 40. Under the policy of the Board will be found a note with regard to the possible revision of the standards of accommodation which might materially affect the cost per pupil, which is of course the final test.

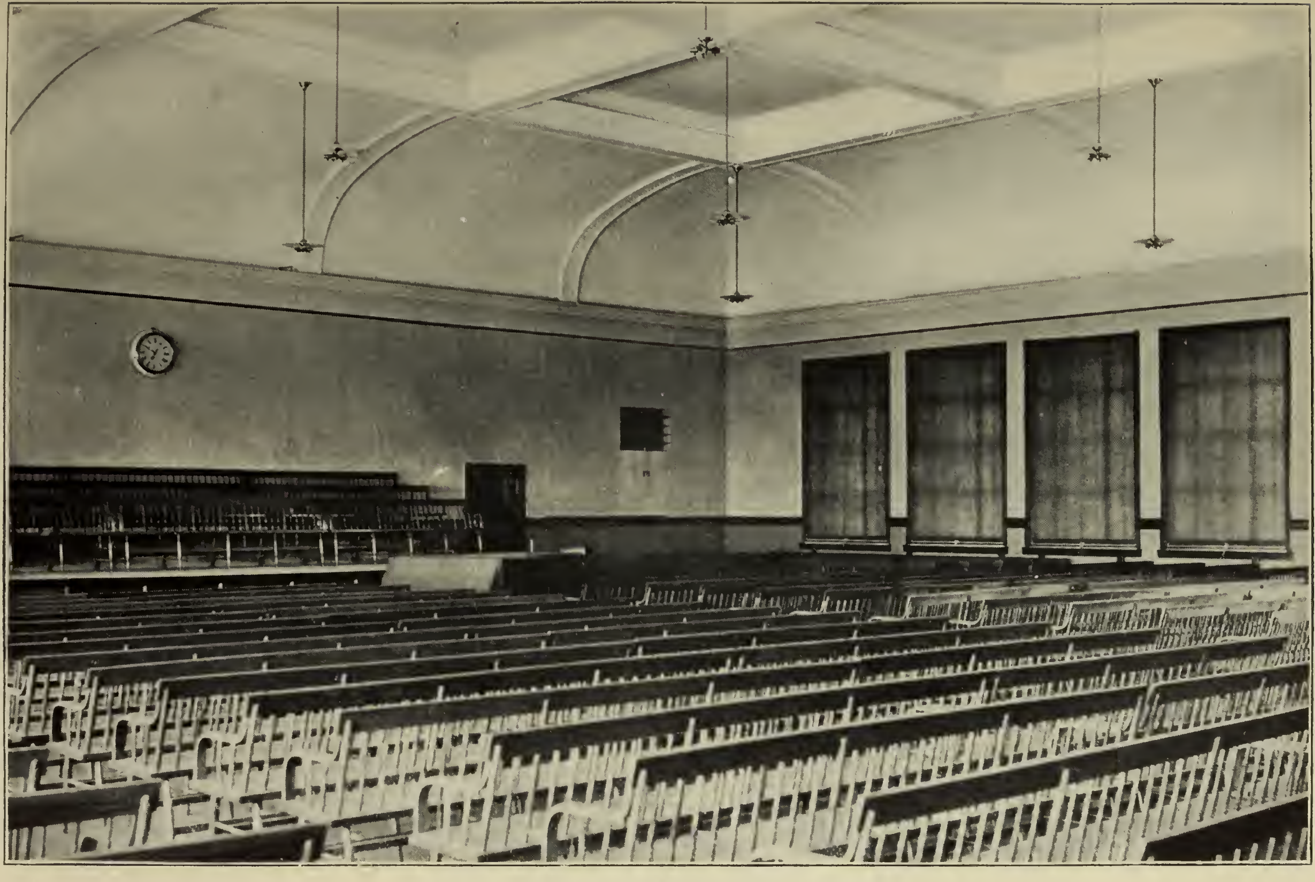
(3.) FUTURE ACCOMMODATION.

As reported last year the Board had then made a careful study of the more congested districts, and was prepared to advise with the Superintendent of Schools as to the best method of meeting the present elementary needs. It was not until March 12, 1906, that the new School Committee, which took office on January 1, appointed Mr. Stratton D. Brooks as Superintendent of Schools. The School Committee had on its shoulders the reorganization of all the work that previously had been undertaken by a body of twenty-four members. The Superintendent had to organize the whole of his work on more or less new lines. It was out of the question to expect that either the Superintendent or the School Committee could, during the first months of office, be in a position to advise with the Board of Schoolhouse Commissioners as to the future needs of accommodation. Moreover, as there was no appropriation for new buildings from the tax levy, and no bill before the Legislature asking for permission to borrow, there was no money available to be expended on new buildings, except the small balance which the Board believed should be appropriated largely, if not altogether, for the purchase of land. Before the close of the school year in June, however, the Board had made an informal study of the school situation throughout the city, and found that for elementary needs the West End (the Washington, Wells, Phillips and Bowdoin Districts) was the most congested, and the most difficult of solution; that the North End was already crowded and in some cases served by unfit buildings; that in various districts where rapid growth was being made it was desirable to take land before it was occupied by buildings. This would apply to the Oak square end of the Bennett District, the Robert G. Shaw District, and to East Boston, the districts covered by the Blackinton, Emerson, and Chapman and by the Adams. The needs of the Edward Everett, Hyde and Sherwin districts have already been referred to in the previous report, and to these is to be added the Dudley. In fact, there is hardly a district that can be said to be supplied with any provision for the future. On June 25, 1906, the School Committee voted that additional accommodation was required in the Washington District, but the Board has taken no final action here, because the only lots that seemed in any way available belonged to other important city departments, and it would have seriously interfered with their work if the land were taken by this Board. Moreover, one of the lots was on the extreme edge of the congested district, and the Board believed, and was confirmed in this opinion by a conference with the Superintendent and with the masters of the Washington, Wells, Phillips and Bowdoin Schools, that the question was a larger one than merely the relief of a single district, so that although the Board proceeded so far as to appoint an architect, Mr. James T. Kelley, on September 26, 1906, and to have tentative plans prepared for one site, nothing definite has yet been accomplished.

With the building of the Charles River dam and the large park area that was to be added by this construction for the benefit of the people of this immediate neighborhood, it seemed to the Board that it would be for the best interests of the district and of the City of Boston to ask permission to erect the building so much needed for the relief of the West End on a portion of the Charles River embankment. A building so located as to be near the present boys' playground would offer the boys the advantages of an indoor gymnasium and baths. The population in this district is almost wholly Hebrew and foreign, and the evening school work is in some respects quite as important as the day work. At present this is carried on under very uncomfortable conditions at the Mayhew, and under conditions something better at the Wells. The new building would provide for this. The population of this district lives in crowded tenements, and both the children and the mothers would get the advantage of the building on the park, which would give them better air, shelter from the sun and heat, and convenient toilet accommodations; and the summer school in this location would be infinitely better than in a



HALL, DEARBORN GRAMMAR SCHOOLHOUSE,
Roxbury.
EDWIN J. LEWIS, JR., Architect.



HALL, LOWELL GRAMMAR SCHOOLHOUSE,

Roxbury.

Shepley, Rutan & Coolidge, Architects.

place in the midst of the crowded tenements. The area on the embankment is approximately 400,000 square feet, and not more than 20,000 of this total would be occupied by the proposed building and its yard, while just beyond the dam a park will be built with an area in excess of 300,000 square feet. A petition has therefore been presented to the Legislature, asking permission to locate a building for the relief of the congestion of the West End on the embankment.

In the Dudley District, the School Committee voted on October 24, 1905, for additional accommodation. The Board had hoped in the past to relieve this district with the completion of the Dearborn School. Before that it had been suggested that the Dudley and Dillaway Schools might both be enlarged. The Dearborn School is full and has not relieved the situation, and it is not practicable to enlarge either the Dudley or the Dillaway Schools, and therefore to provide for additional accommodation in this district the Board advertised for land on January 31, 1907.

In the Edward Everett District, the Board voted on November 16, 1906, to request the Board of Street Commissioners to take land for a grammar school, and in compliance with the vote of the School Committee of January 7, 1907, asking that provision be made for additional elementary school accommodation in this district, the Board advertised for, and have under consideration, offers for land; the latter accommodation being more especially for the benefit of the residents of Savin Hill, and the former for the benefit of the whole district.

In the Bennett District the School Committee passed a vote on November 21, 1906, asking for additional accommodation, and the Board, in response, asked the Street Commissioners on January 11, 1907, to take land adjacent to the Hobart Street School, and advertised November 26, 1906, for land for a new elementary school, offers for which are now held under consideration.

In the Blackinton District, the School Committee on January 2, 1907, voted that additional accommodation was needed, which the Board understood to mean a building so located as to relieve the Emerson District, which, in turn, might relieve the Chapman District, and the Board on January 21, 1907, opened bids for land accordingly, which bids are under advisement.

In the Robert G. Shaw District, the Board has received a favorable proposition for the purchase of land adjacent to the Mount Vernon Street School. This provides a lot of nearly 80,000 square feet for the future elementary needs of this district. The Board believes that land should be taken to provide better accommodation for the Germantown end of the district, and have written to the Superintendent of Schools for advice on this point.

In the Quincy District, the School Committee voted on January 21, 1907, that additional accommodations be provided for manual training, and the Board on January 24, 1907, voted to request the Board of Street Commissioners to take land adjoining the Quincy School, in area approximating 1,584 square feet, on which will be erected a building for the teaching of manual training.

In the Phillips District, the School Committee passed a vote January 21, 1907, asking for additional elementary school accommodation, and the Board on January 24, 1907, advertised for land in this district.

In the Lewis District, the School Committee by vote of November 5, 1906, authorized the establishment of a High School of Commerce, and the Board on January 19, 1907, advertised for land for this purpose.

(4.) SANITATION INSTALLED.

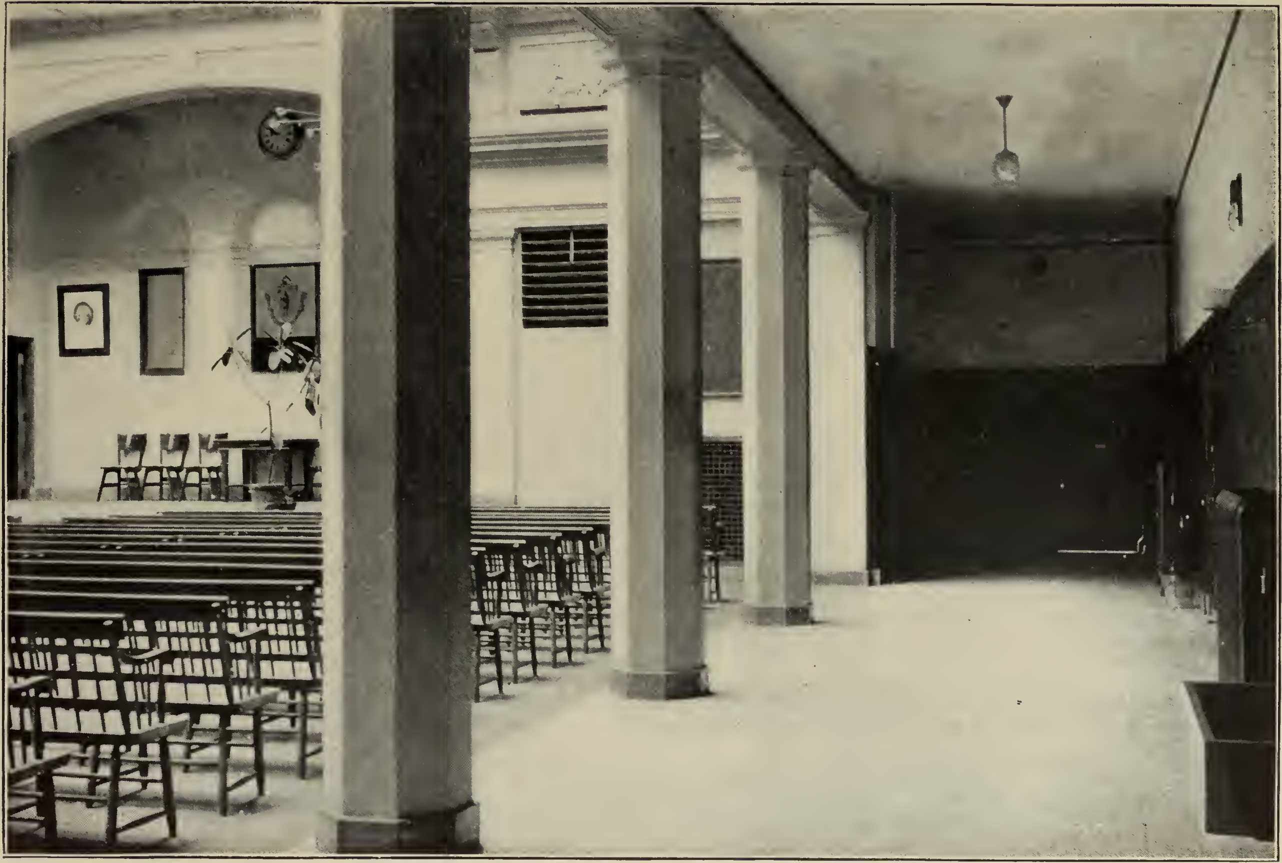
As reported last year the most serious of the sanitary problems in the old schools have been taken care of, and whatever work is now done will be in the nature of replacing systems, such as flush vaults, which, though not absolutely unsanitary, are by no means in line with modern work. Beside the schools that have systems that should be replaced, there are, as previously noted, a considerable number of schools whose material condition is not such as to warrant the expenditure of a considerable amount in order to put in new sanitation, either heating or plumbing. The following is a list of such buildings.

Those having flush vaults, good of their kind, but not modern:

Cudworth.
B. F. Tweed.
Abby W. May.
Williams.
Agassiz.
Margaret Fuller.
Wyman.
Cushman.
Hancock.
Gaston.
Washington Street, Germantown.
Winthrop Street.

The Brimmer and Winthrop might also fall under this same clause, and the Board have a new building in contemplation to replace both of these old schools.

There is one building with a cremating system, the Henry



HALL, THOMAS GARDNER GRAMMAR SCHOOLHOUSE,
Brighton.
STICKNEY & AUSTIN, Architects.

L. Pierce. No complaint has been received of the system in this school, and it has therefore been allowed to remain.

The following have vaults in out-houses, but the buildings themselves do not warrant any expenditure:

Austin.
Baldwin.
Sharp.
North Margin Street.

The fixtures in use by the Board are the same as those reported on in previous years, with the exception of a slight modification of the short-hopper closet, which gives us a heavier bowl and does away with the necessity of having an independent support for the seat.

The following is a description of the work done this year:

COTTAGE-PLACE SCHOOL. This is a three-room kindergarten building in the Comins District. Old long-hopper closets and all old plumbing in building removed. New installation of four low-down closets on first and second floors. New teacher's closet on second floor. New soapstone sink for kitchen in basement, two slate sinks on first and second floor. New wastes, vents and supplies throughout. Old laboratory bowls were reset, but new traps, wastes and vents were connected up to same. In connection with this work, general repairs, such as whitewashing basement, new coal-bins, repairs on stairs and painting and tinting of toilet and lavatory rooms were provided for. Completed, September, 1906. Cost $1,452.03.

HYDE SCHOOL. This is a fourteen-room grammar building in the Hyde District. Old system of vaults in basement and all old plumbing in building removed. New system installed in basement, consisting of 42 short-hopper closets, two 12-inch long slate sinks, 1 janitor's galvanized iron sink, 1 janitor's water-closet. Above the basement were placed 6 slate sinks, 2 on each floor; 1 teacher's closet, 1 master's closet, 1 emergency closet, 1 kindergarten closet, 2 bowls, also 2 extra bowls without backs or slabs were provided in the third story, and wastes, vents and supplies throughout. A complete system of yard drainage was installed, consisting of 4 catchbasins, connected direct to main surface drainage sewer in street. A complete extra surface drainage system to take care of rain water, independent of the sewage system direct to surface drainage sewer in street, was also installed. New local ventilation for closets connected up with the present local ventilation fan system in the building. Owing to the nature of the soil in this locality it was necessary to relay the entire basement floor, which had settled badly. Iron floor beams were laid, on these a flooring of concrete slabs was placed and the entire floors covered with granolithic finish, except the toilet floors, which were covered with an asphalt finish. The heating and ventilating system was repaired, the stacks in the basement bricked up, and a general rearrangement of galvanized iron intakes made. Completed September, 1906. Cost $14,344.20.

(5.) Fire Protection.

Again emphasis must be placed on the seriously reduced amount available for repairs, which has made the work under this heading, imperative as it may appear to some, out of the question for the Board to undertake either systematically or thoroughly. The Board has a complete statement of the existing conditions in all the schools of the older types, the report dealing more especially with the condition of the heating apparatus, its location, and the materials in the walls or floors near it, and the material of ducts and the method of construction about them. When the amount available in the repair fund is sufficient to take care of this work, the Board hope to undertake it systematically, until all the basements of the older schools are properly protected from fire. In addition to this, they will equip, where required by the Fire Department, with fire-escapes, but in the opinion of the Board these are not intended for and should not be used by the children, except in cases of extreme emergency and then under the supervision of the Fire Department. The Board believes that the most effective kind of fire protection in the schools is to protect from fire by safeguarding the heating apparatus and the coal-rooms, and that the children can always be most quickly and most safely taken out of the building by the regular means to which they are accustomed.

The work installed this year under this head was the fire-escape in the Sharp School, together with miscellaneous work in connection with changing bolts on front doors, and installing fire gongs.

III.

REPAIRS.

Under the appropriation for 1906–1907, $247,400 was available for repairs and for administration expenses. Of this $22,532.55 was paid for administration expenses and $15,666.57 was required to pay accounts belonging to 1905, but which could not be met, owing to the unexpected strain on the repair account, due to the expense of making good the damage after the fire in the Lewis School; the latter amount represents an actual deficit, chargeable against the repair account for 1905–1906. Deducting these two amounts the Board started the year, therefore, with $209,200.88 for repairs. With this amount the Board was expected to continue repairs of all the buildings that existed in 1902–1903, when the amount expended for repairs was $277,059.81, and to repair and keep in condition $3,729,284.63 worth of buildings erected since that date, and, beside this, to make the major repairs in heating and sanitation which, up to 1906, were taken care of by the appropriation for Land and Buildings for Schools. The total valuation of the school property of the City of Boston in 1906 was $16,782,000, of which $12,075,200 represents the value of school buildings, and $4,706,800 the value of land; of the $12,075,200, the sum of $4,183,600 represents buildings that may fairly be called new buildings of modern construction, and the remainder are entirely either second class construction or third. It is not only a good investment for the city to see that their first-class buildings are kept in absolutely good condition, but it is also economy for them to see that such of the old buildings as are yet to stand should be put in such condition as to make them a good investment for the city, to make their heating and ventilation and sanitary equipment up to the standard of modern requirements, so that the health of the children may be preserved, and to protect them, as far as possible, from danger from fire.

The system for making repairs is the same as that reported in detail last year. It is there suggested that while the Board is satisfied with its system for major repairs, it is not so satisfied with its system for minor repairs, and hoped that it could arrive at some method where these could be executed at a reasonable cost and without the delay and red tape that are now entailed. Other large cities, notably Chicago, have been entirely successful in managing repairs themselves with their own force, and we believe that it ought to be possible to take care of the bulk of our minor repairs in the same way. The Board has taken the matter of general repairs under consideration, and has already its expert electrical engineer and a working electrician for the electrical repairs.

IV.

POLICY OF THE BOARD.

The policy of the Board remains unchanged as to the new buildings of elementary grade, their cost and equipment, and the relation of the Board to the architects and contractors employed by them. The agreement that is made between the Board and its architects is included in Appendix V. for reference.

The problems connected with the erection of high schools have been advanced, first, by an admirable report on the equipment of chemical laboratories, prepared for the Board by Professor Charles R. Sanger of Harvard. This report was based upon the careful study of the equipment in the English High, Mechanic Arts High, West Roxbury High, Roxbury High and Dorchester High Schools, and on his own experience as a teacher of chemistry for the last twenty-five years. The conclusions arrived at by Professor Sanger are given in Appendix VI. Second, a report on the equipment of physical laboratories, prepared by the Assistant Superintendents and supplemented by a special report on electrical equipment (*see* General Information, First Class Construction, Physical Laboratory); third, a report on the equipment for the handicraft, or manual training, for High Schools, by Assistant Superintendent White. (*See* General Information, First Class Construction, Handicraft Room.) These will certainly help to establish a reasonable standard for equipment for all of this work. The Board has also decided to try experiments in the Charlestown High School, looking towards the solution of the problem of the disposition of school books when a building is used for both day and evening work. If the desks are open, there is always danger of the contents being used, or in some way interfered with. If they are locked, there is not only the expense, but the trouble with lost keys, etc. At the Charlestown High we are providing box desks, not intended for the reception of books, except temporarily, and at the close of the day session each pupil puts his books away in a pigeon hole assigned to him, and the whole set is locked by the teacher. The evening school will then have the occupation of an empty desk. If this proves successful in the Charlestown High, it may well be adopted in the elementary schools where evening work is done. We shall also test in the Charlestown High the experimental lecture-room seat, referred to in last year's report.

On the subject of domestic engineering, the Board has been able to carry out part of its plan outlined in last year's report, page 26, and has appointed an electrical engineer and an assistant, a working electrician; but has not yet found the right man to take charge of the heating and ventilation. It seems to the Board that the time has now come when it would be of advantage for it to take complete control of everything connected with the erection of the new buildings, establishing permanent departments under Civil Service examinations, which should have charge of the buildings, an architectural department, a department of domestic engineering, of heating and ventilation, of electric work, and of all problems of civil engineering, lines, levels, surveys, etc. At the present time the Board has a civil engineer and an electrical engineer, and believes that it would be of advantage to the city to extend this service to include all of its work. It might appear that this is reverting to the system represented by the appointment of a city architect, and which was not considered successful. It differs, however, from this in two essential points: first, that the architect would, in this case, be an employee of a governing board; and second, having been appointed under Civil Service, would be practically a permanent official of the Board. The Board has already had the practical assistance and co-operation of a large number of the most skilled architects in Boston, and with their assistance has established a standard for construction and equipment, which can be better handled by a single architectural office than by a succession of offices, all of which cannot be expected to be familiar with the work of the Board. A single permanent architectural head would be able to carry on a consistent policy, while the fact that he was directed, and to some extent controlled, by the Board, would be a safeguard against the work getting into undesirable ruts. At present the force of the department is as follows:

Three Commissioners,
Secretary,
Executive clerk,
Auditing clerk,
Two stenographers,
Telephone operator,
Seven inspectors,
* Architect,
Two draughtsmen,
Civil engineer,
Electrical engineer,
Working electrician,
Two messengers.

As intimated in the report of last year, the radical change in the School Committee has been of great advantage to this Board, and will be of still more advantage in the future now that the preliminary work of re-arranging administrative matters has been finished, and the School Committee, with the Superintendent and Assistant Superintendents can devote their attention more exclusively to the actual management of the schools. The chief change in the duties of the School Committee lies in the fact that a large amount of authority and responsibility now rests with the permanent educational experts, the Superintendent and the six Assistant Superintendents. As this Board is officially concerned with the Superintendent, and almost exclusively with him, his added powers are of material assistance to this Board in the problems relating to school population, its growth and the location of new buildings.

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*It will be seen from the above that the Board has an Architectural Department, but this department is not equipped for designing and making working drawings for new buildings, and is employed simply on such architectural work as is connected with repairs.

The School Committee has obliterated a somewhat imaginary line between primary and grammar children, and this action will affect the work of the Board, especially if it trends in the direction of putting a larger number of children into the elementary schools of lower grade and reducing the number of grades that are in the central district school, where the children have the additional advantages of equipment for manual training and cooking and of an assembly hall. Undoubtedly the next step which will affect our buildings will be in the direction of reducing the size of the classes, preferably throughout all grades, but certainly in the lower elementary grades; all of which would indicate that our growth will be along the lines of a large number of medium sized schools from ten to twenty rooms, rather than in the direction of schools of thirty rooms or over.

By an Act of 1906, chapter 259, a Joint Board, consisting of the Mayor, the five members of the School Committee and the Schoolhouse Commission, was established, which Joint Commission has the right to sell school property. Here are united in one body all of those who have the necessary information and authority to enable them to act wisely in these matters. It is certainly a far better arrangement than that which existed before, of going through a number of bodies in order to accomplish the disposition of school property.

There is another incidental advantage in the appointment of this Joint Commission, in that it brings together officially a body which may unofficially and informally discuss matters which are of mutual interest.

The bill now before the Legislature seeks to give to this same Commission the power to purchase land, which at present is done by a cumbersome and complicated method that has proved most unsatisfactory.

The close relationship established between the School Committee, the Superintendent and Assistant Superintendents and this Board has already proved of great assistance in helping to solve the problems of accommodation and district lines, which belong legally the one to the Board and the other to the School Committee, although as a matter of fact the questions are practically the same and are interdependent. This was touched upon in the report of last year. The policy of the Board, therefore, while remaining substantially as it has been outlined in the past, will be far more effectively carried out under the circumstances at present existing.

More and more it is forced upon this Board that a knowledge of the educational problems of the day is essential for a proper and intelligent execution of the work entrusted to it. The theory that elementary education is a course which all alike pursue, if modified so that in later years of study a difference is made between the children who go to work on graduation and those who are to carry their education farther, will necessarily affect the buildings, their size, and perhaps also their equipment. A similar difference in high schools, between those who on graduation go to the university, or go to a technical or commercial school, or go to work, will affect the equipment of the high schools. The use of buildings for evening study or for technical work of a more commercial character will affect the arrangement of classrooms and the position and size of the assembly or lecture halls. The demand for technical and industrial education, to which we are so slowly awakening, will affect even more than any of the above things the planning of schools. In Appendix X. will be found a brief description of some of the technical work being carried on in London, and also of the system which enables the government authorities — the Board of Education — to keep in touch with all the educational work in England and Wales, and to systematize and unify it. It is this Board that has shown the need of and worked out the system for the trade, technical and academic education, which, as applied in London, makes a comprehensive scheme for the whole field. In all these matters educational questions are predominant, and they are of great importance to the Board whose work is to provide accommodation for the school children. Some of their problems are hygienic and yet have their educational side, so that the Board of Schoolhouse Commissioners needs the help of the Superintendent and School Committee to make effective the work it tries to accomplish. If, for example, a chair is provided to correct attitudes injurious to the health of the child, it rests with the school authorities to see that the furniture provided for this purpose is understood, is properly adjusted, and that the children are taught what attitudes are correct and are encouraged so to sit. In such matters the Board hopes for the co-operation and assistance of the school authorities, as it in return expects to act only under their advice and with their approval, and that they may act wisely the members of the Board must keep abreast of the times in educational matters.

V.

GENERAL DEDUCTIONS.

It is well to repeat, chiefly for the benefit of architects working for the Board for the first time, the requirements as to school buildings. Even if this work were eventually taken up by the Board itself, it would seem desirable that these requirements should be printed every year, so that the Board may at least be assured that they are read over and if necessary revised every year and not allowed to become stagnant. All buildings are required to be fireproof (so-called first class construction) throughout; cost limited by allowing from 30,000 to 35,000 cubic feet per class-room for the lower elementary schools and 22 cents per cubic foot; by allowing a sliding scale of cubic feet per class-room for the higher elementary schools (p. 14 of last year's report) and 22 cents per cubic foot; common red brick and stone for the exteriors, and the smaller the building the less the ornament; the grounds outside the building from 25 to 40 square feet per pupil, to contain playgrounds, planted spaces and gardens, and to be as open as possible for daily use. To this one may add the experimental figures for estimating cost of high schools, varying from 82,000 cubic feet per class of forty in a small high school to 66,000 cubic feet per class of forty in a large building, and the addition of 2 cents to the cost per cubic foot, making it 24 cents for the high schools. (See p. 10.)

In addition to this it may be noted that the Board has found that soft foundations requiring piling, waterproofing, reinforced concrete, or any other unusual expense below grade, will add in the neighborhood of 2 cents per cubic foot to the building, and where such conditions exist the buildings must be so designed as to keep them down to the absolute low limit of cost.

The types of plan which in practice have been found most satisfactory (omitting those which, like the Oliver Wendell

Holmes, the Dearborn or the Tuckerman, were adapted to some peculiarity of site) may be divided into those which have one really desirable exposure, those which have two equally desirable, and those which have three or four sides almost equally available. This refers only to light, not sunlight. In the matter of aspect sun appears to be desirable for a part of the day in every class-room, but is apt to cause inconvenience in school hours. East and west are therefore the most desirable exposures; south and north are undesirable, as the one has too much sun during school hours and the other none. Too much is far better than none. The only really poor aspect is therefore due north, and this would apply only to rooms that are not on the corners, as these could have sunlight from a second side, which appears more desirable than to adhere strictly to the theory of lighting from one side only. In grammar schools the plan is also affected by the position of the assembly hall. There are schools containing assembly halls on the first or second floors (we believe it undesirable to consider a higher floor for this purpose).

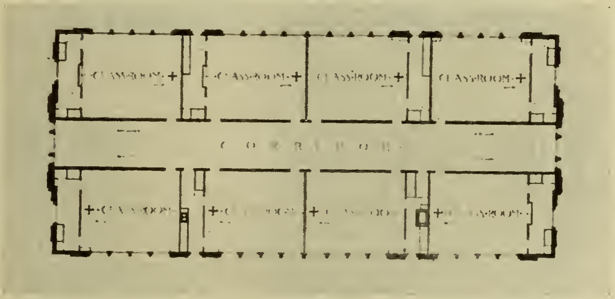

FIG. 1.

Various arrangements of rooms grouped on either side of a central corridor have been found satisfactory. The Jefferson (Fig. 1) is the simplest type, the rooms on either side of a corridor all facing one way.

The Oliver Hazard Perry Grammar and the James Otis Primary (Fig. 2) are the same with the end rooms turned; in some ways a better arrangement than Fig. 1. One is with and the other without a second story assembly hall, but both presuppose the best exposure at the ends.

The Ellis Mendell (Fig. 3), or better, because more compact and without unnecessary staircase space, the John Greenleaf Whittier (Fig. 4), is the corridor type when one side is distinctly preferable, a good type for places where the ends of the buildings are not free.

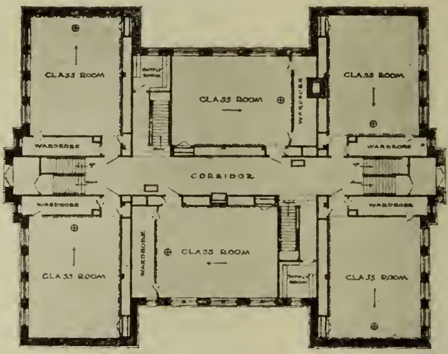

FIG. 2.

It is evident that as Fig. 2 is more compact than Fig. 1, so Fig. 4 is more compact than Fig. 3.

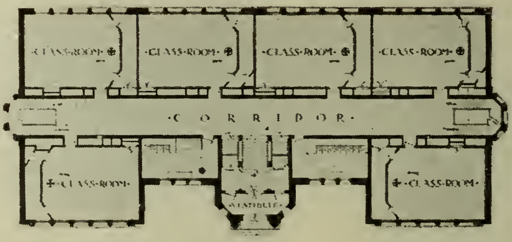

FIG. 3.

The most compact type of all was developed in the Sarah J. Baker (Fig. 5), where two four-room plans were put together with no connecting corridor. Notwithstanding the fact that four staircases were necessary, this proved as economical as it appears. But unless it were really two schools put together the plan does not commend itself. It is sacrificing administration to economy. This type appears capable of development for schools, with eight rooms on a floor, so as to be economical and yet have through communication everywhere.

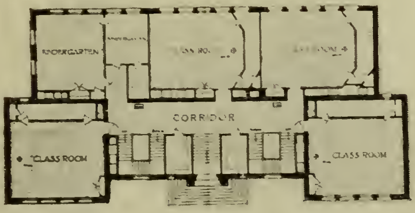

FIG. 4.

The Mather (Fig. 6) is the corridor plan with the addition of wings and is an economical arrangement, but the New York development of this scheme would seem on the whole to be better. Here we sacrifice the whole centre of the building, the second and third floors, to the assembly hall. There they place the assembly hall in the space enclosed by the wings on the basement and first floor.

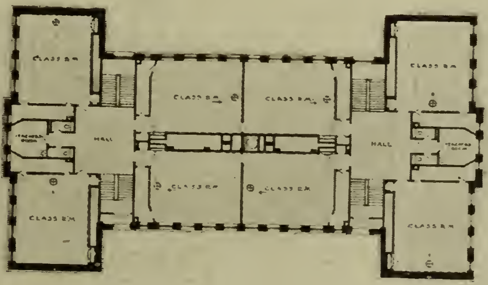

FIG. 5.

The New York plan puts the assembly hall in the centre, on the first floor, and surrounds it on three sides with rooms, and doubling this from street to street gives an H plan. When the building occupies a whole block (Fig. 7) it has light for class-rooms both on the outside and on the inner areas; when this plan is restricted by party lines it ends with

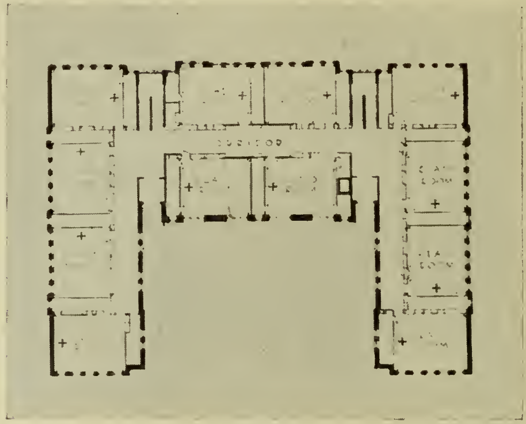

FIG. 6.

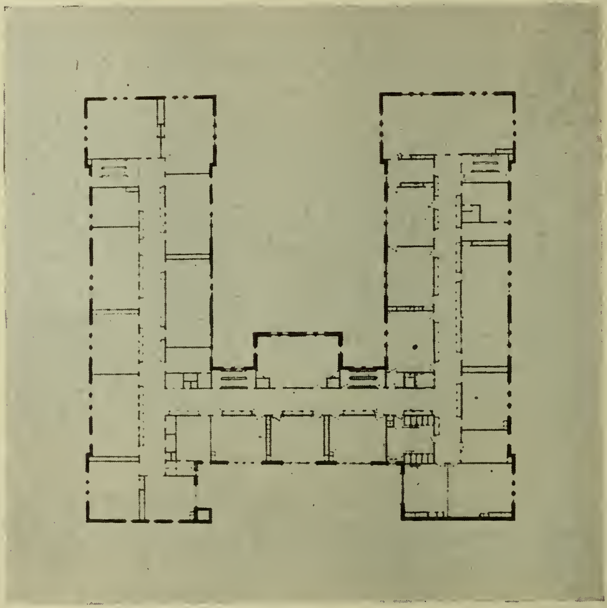

FIG. 7.

the corridor (Fig. 8), and all the rooms depend for their light on the areas framed by the sides of the H. This is an excellent plan, but requires a very large school for its development.

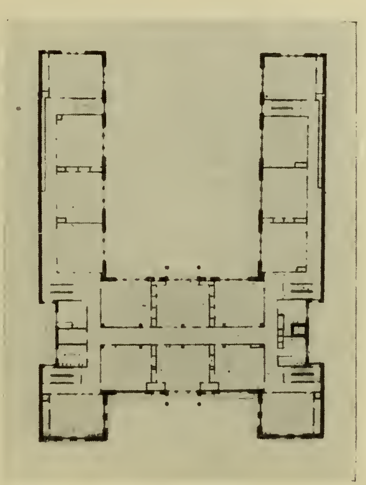

FIG. 8.

The Patrick A. Collins (Fig. 9), the Model School of the Normal Group, is of this general type, but does not depend on the court above the assembly hall for light for class-rooms. It appears to be an excellent plan on its cube test.

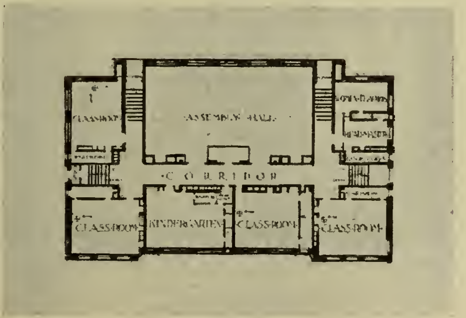

FIG. 9

Another variant on this is the Thomas Gardner (Fig. 10), where the rooms surround (or will eventually) the assembly hall.

This is carried to its logical solution in the latest Chicago type (Fig. 11).

This type, like Fig. 7, requires a complete block with ample light on all sides. The assembly hall is in the centre, top-lit, and the rooms are on the outside perimeter. It is evident that this, while in many respects an ideal plan, is not an economical one, as the corridor space is out of proportion to the rooms served. The area of 16 rooms doubled would be 23,000 square feet. The actual area of the second floor is 27,000. It would seem as if a combination of the compact New York plan with the fine, open thoroughfare of the first floor plan of this Chicago type might give an almost ideal plan for a very large school. Further notes on the New York and Chicago schools and also on St. Louis schools will be found in Appendix IX.

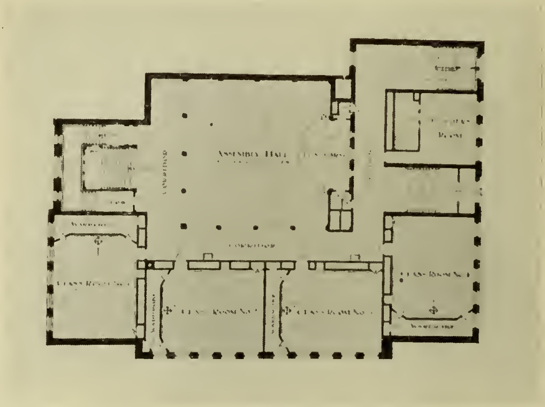

FIG. 10.

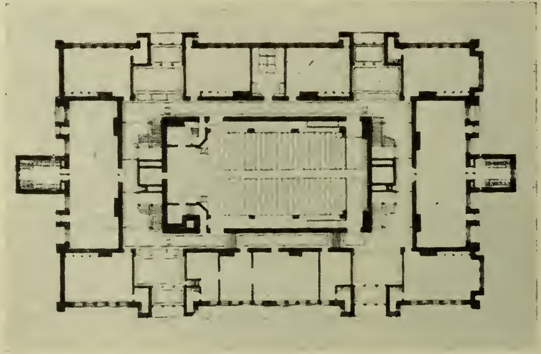

FIG. 11.

GENERAL INFORMATION FOR FIRST CLASS CONSTRUCTION.

ELEMENTARY SCHOOLS.

SCHOOL-ROOMS. (1.) *Size* will be 24 by 30 Primary and 26 by 32 Grammar and not less than 13 feet in clear. Modification allowable only after consultation with the Board. Every room shall be numbered on the plans to designate it.

(2.) *Windows* will be on the long side for left hand lighting. The glass shall contain not less than $\frac{1}{5}$ of floor area, about 160 square feet for a room 24 feet wide;* neither double run of sash nor double glazing will be required, but a dust-proof weather strip; the head square and close to the ceiling; the sill about 2 feet 6 inches from the floor; the windows divided with muntins, no large sheets of glass. Finished with plastered jamb, no architrave, metal corner bead.

(3.) *Doors.* — One to corridor, 3 feet 6 inches by 7 feet, partly glazed, to open out, placed preferably near the teacher's end; brass-plated steel butts, 3 lever mortise lock, master-keyed; cast-brass knobs, marble thresholds to fireproof corridors. Doors to have 2-inch plain brass numbers and cardholders 3½ inches by 5 inches.

(4.) *Floors* will be Georgia pine rift, or maple.

(5.) *Walls* will be painted burlap up to top of blackboards or of tack boards, and above this plaster, tinted in water color; the blackboards 4 feet high; 2 feet 2 inches from floor in Kindergarten, 2 feet 4 inches to 2 feet 6 inches in Primary and 2 feet 6 inches to 2 feet 8 inches in Grammar. Behind the teacher and on one long side in Primary, and behind the teacher on long side and end in Grammar and High. These will be of best black slate, $\frac{1}{4}$-inch thick. In Primaries a rack or tack board for holding cards is required above the blackboard. A picture moulding at top of burlap and also near ceiling in both Primaries and Grammars. (See drawings.)

(6.) *Ceilings* will be level, plaster, no paint nor tint.

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*It is evident that if this area of glass is requisite to light a room in a building with free space about it, such for example as the Sarah J. Baker School, it is inadequate for a room in a building situated, like the Christopher Columbus, on a narrow street. Under exceptionally free conditions, with no obstruction to the direct light from the sky, it is possible that the area of glass might be reduced, but it appears to be no more than enough for the ordinary conditions of the new buildings, and should be increased, if possible, for such situation as that of the Columbus.

(7.) *Lights.* — Six groups of four 10 c. p. lamps each and light for teacher's desk; electric, no gas.

(8.) *Heating and Ventilation.* — The inlet for heat about 5 square feet, the outlet for ventilation about 5 square feet for gravity system and 3 square feet for fan.

(9.) *Bookcase.* — Provide a bookcase in any convenient position, capable of containing 300 octavo volumes; upper doors fitted with pin tumbler locks, and latch and knob; drawers fitted with pin tumbler locks. Lower doors to have pin tumbler locks; same lock in each bookcase; all bookcase locks master-keyed. (See drawing.) Special equipment for care of books where school is day and evening is described on page 18.

(10.) *Map Supports.* — Provide one map support for each class-room in Grades VI., VII., VIII. and IX., preferably behind the teacher's desk or opposite the windows, fixed close to the ceiling. (See drawing.)

(11.) *Teacher's Closet.* — Provide a small closet for teacher's coat and hat, preferably opening from the class-room, but allowable from the wardrobe.

* WARDROBES.

(1.) *Size.* — Wardrobes will adjoin school-rooms and be from 4 feet 6 inches to 5 feet wide.

(2 and 3.) *Windows and Doors.* — Outside light; two doors, both connecting with school-room and not to corridor, and having no thresholds. Doors, double swung, 2 feet 6 inches wide, brass double acting butts, foot and hand plates, hooks or adjustable stops to hold open, ventilation under door farthest from vent.

(4.) *Floors* as in school-rooms.

(5.) *Walls.* — Painted burlap up to hook rail; poles on brass-plated iron brackets with hooks under and pins over, 56 in number. Shoe-rack and umbrella clip below. (See drawing.) Walls above, plaster, tinted. Height of lower pole, Kindergarten, 30 inches from floor; Primary, 36 inches to 40 inches; Grammar, 44 inches, 48 inches and 52 inches; distance between poles, 8 inches for Primary and Grammar, 12 inches for High Schools.

(6.) *Ceiling.* — Plaster. No tint.

(7.) *Light.* — One lamp. Ceiling outlets, electric.

(8.) *Heating and Ventilation.* — Heating, direct. Ventilation, direct, 1⅝ square feet area cross section.

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* A suggestion in regard to wardrobes comes from Chicago, and is embodied in a description of Mr. Perkins' recent plans. It seems an admirable suggestion, and should lead to considerable economy of space. (Appendix IX.)

CORRIDORS AND VESTIBULES.

(1.) *Size.* — Not less than 8 feet wide for four rooms on a floor; not less than 10 feet for over four rooms, governed by length, access to stairs, etc.

(2.) *Windows.* — Outside light essential.

(3.) *Doors.* — Outer doors to open out, heavy butts, standard, master-keyed, school lock; door check; heavy hooks to hold open. Vestibule doors open out, heavy butts, pulls, push plates, hook to hold open, door checks, no locks.

(4.) *Floors.* — Tile, terazzo, or granolithic.

(5 and 6.) *Walls and Ceilings.* — Painted burlap, 7 feet high, untinted walls and ceilings. Finish burlap with painted line or a dado cap, and put picture moulding at ceiling in corridors.

(7.) *Light.* — Ceiling lights, two lamps each, electric, also gas for emergency in corridors, on stairs and in vestibules.

(8.) *Heating and Ventilation.* — Heat, direct. Ventilation, none.

(9.) *Sinks and Closets.* — On each floor above the first one or two 4-foot sinks and emergency closets: one for boys and one for girls.

STAIRCASES.

(1.) *Number and Arrangement.* — Determined by building laws, but fireproof construction in all cases.

(2.) *Material.* — The treads, North River stone on iron string, or concrete construction with granolithic surface. Rails of a simple pattern, easily cleaned; wall rails not necessary.*

(3.) *Steps.* — About 6½ or 7 inches by 10. Rail not less than 2 feet 8 inches on runs and 3 feet on landings.

SANITARIES.

(1.) *Size.* — General toilet-rooms in basement, in size approximating space for 3 water-closets for each school-room, two girls', one boys', and 36 inches of urinal for every school-room, arranged for convenient supervision and circulation.† Slate sinks, length from 10 inches per class-room in small buildings to 6 inches per class-room in large buildings, located preferably in the play-rooms. In large schools the number of closets may be considerably reduced, especially on boys' side. The above refers to mixed schools.

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* In many schools the children are required to file in the centre of the stairs and to keep away from the walls. Where this is the rule a rail on the wall appears needless.

† Inquiries have been addressed to principals of all schools where water-closets and urinals have been installed on this basis, and the concensus of opinion appears to be that the number cannot be reduced without inconvenience, but that it is satisfactory as it stands.

(2.) *Windows.* — Ample outside light; glazed where exposed to view outside with factory ribbed glass.

(3.) *Doors.* — The doors arranged "in" and "out," with spring or door check and stout brass hooks to hold open; glazed with ripple or ribbed glass; half-doors to water-closets except where ordered omitted.

(4.) *Floors.* — Asphalt. Boys' drained to urinal, girls' to floor-wash.

(5.) *Walls.* — Salt-glazed brick, or other non-porous, inexpensive surface, 7 feet high; above, brick painted.

(6.) *Ceiling.* — Untinted plaster or whitewashed concrete. No basement ceiling need be furred level.

(7.) *Light.* — Ceiling lights in groups of three lamps.

(8.) *Heat and Ventilation.* — Heat direct. Ventilation through fixtures back of urinals, and 10 square inches local vent from each water-closet.

MASTER'S AND TEACHERS' ROOMS.

(1.) In each grammar school a room of about 240 square feet for the master, with a water-closet and bowl and a book-closet adjoining. This room should be near the centre of the building, *i.e.*, on the second floor in a three-story building. In all schools, a room or rooms for teachers, averaging about 300 square feet for ten teachers, with one water-closet and bowl for each ten.

(2.) Where men as well as women are teachers, a separate small room with toilet accommodations for men.

(3.) Opportunity in teachers' rooms for warming luncheon, either gas or electric, unless there is a cooking-room in the building.

PLAY–ROOMS.

(1.) All free basement space to be arranged as play-rooms for boys and girls. Salt-glazed brick, 7 feet high, and painted or whitewashed brick or stone walls above. Asphalt or cement floors, plaster ceilings or whitewashed concrete.

PLUMBING FIXTURES.

(1.) *Water-closets.* — The basement water-closets for primary and grammar schools are short hopper closets; elsewhere, a heavy wash-down closet. (See drawing.)

(2.) *Slate Partitions.* — Supported at ends with iron pipe about 8 feet high, tied together and to the wall, to which doors are hung. (See drawing.)

(3.) *Urinals.* — The urinals will be of slate, floor slab, trough and back, without partitions, flushed automatically through $\frac{7}{8}$-inch perforated pipe, with hot and cold water; vented at bottom into space behind. (See drawing.)

(4.) *Sinks*, of black slate, self-closing cocks, set 15 inches on centres, and cup-hooks at each side of cocks.

(5.) Floor-washes in sanitaries, as already mentioned. (See drawing.)

(6.) *Piping.* — (*a.*) Cast iron, must be in trenches in basement, running trap with direct indirect fresh-air inlets, clean-outs at every change of direction. Soils and vents exposed as far as possible, no asphaltum, but oil-tested, red lead and three coats of paint.

(*b.*) *Supplies.* — Exposed as far as possible; where covered may be lead, elsewhere brass, no nickel-plate. Hot water for janitor's use in basement; cooking-room, and, if convenient, for master's and teachers' rooms. Supply from boiler and from summer boiler, if any, or from a gas heater, or from cooking-room range.

(*c.*) *Fire Lines.* — In first class buildings over 3 stories high, one or more lines of 3-inch pipe.

SPECIAL ROOMS.

ASSEMBLY HALLS.

(1.) Assembly halls should accommodate the whole number of pupils in smaller grammar buildings, but it is not customary in the larger schools to seat over 800 or 900. The platform should be capable of accommodating one, or, in the large schools, two classes, and should have removable stepped platforms of wood to take the benches. Galleries may be used where the hall is two stories in height. Anterooms near the platform are desirable, and a connection from adjoining class-rooms to the anterooms or directly to the platform. A dignified achitectural treatment of the walls and a studied color scheme is expected. The hall floor will be level. The lighting and acoustics should be such as belong to a small lecture hall. Artificial lighting to be under control from at least two points, one of which must be near an exit.

MANUAL TRAINING ROOMS.

(1.) *Size.* — Room, generally located in basement, should be approximately of dimensions equivalent to a class-room and its wardrobe, preferably a corner room; and arrangement, shown by drawing, for number of benches there given, 28.

(2.) *Light.* — The windows should be as near full length as possible and on two adjacent sides. Artificial light should be provided in six groups of four lamps, as in class-rooms, or individual light for each desk. This latter is preferable where the occupation of room for manual training is permanently fixed.

(3.) *Heat.* — Heat and ventilation the same as in class-rooms.

(4.) *Stock-room.* — Stock-room should contain at least 80 square feet, preferably long and narrow. Two 18-inch shelves should run around the room, 5 feet 6 inches and 6 feet from the floor.

(5.) *Wardrobes.* — Wall space for 30 hooks, not necessarily a separate room.

(6.) *Teachers' Closet.* — Teachers' closet should be large enough to be used also for storage of finished work, and should be fitted with all shelving possible as well as with the customary coat-hooks. An area of 40 square feet is adequate.

(7.) *Bookcases.* — Like those in class-rooms.

(8.) *Blackboards.* — Blackboard space of about 30 running feet, 4 feet high.

(9.) *Work-rack.* — About 28 feet long, 6 feet 6 inches high, and 2 feet deep. (For all of these see drawings.)

(10.) *Wash-bowl.* — A 3-foot sink is a convenience, but not a necessity.

(11.) *Finish of Room.* — A basement room should be finished as a shop; salt-glazed brick up to 7 feet where exposed, and above, brick walls whitewashed; if above the basement, finished as a class-room. The floor is of wood.

(12.) *Furniture.* — (Not included in the building contract.) The furniture comprises 28 benches and stools, 4 display frames about 6 feet long and 30 inches wide, demonstration steps and guard rail, teacher's desk, table 4 feet by 2½ feet with unfinished top, one desk chair and two common chairs.

COOKING-ROOM.

(1.) *Size.* — Should have an area equivalent to class-room and its wardrobe, preferably a corner-room.

(2.) *Light.* — Windows as a class-room, but not necessarily left hand; if located in a corner, from two sides. Artificial light as in a class-room.

(3.) *Heat.* — Less heat is required than in a class-room, but the ventilation should be the same, with additional vent from the demonstration ranges.

(4.) *Wardrobes.* — Provision for 28 pupils, clothes hooks in separate lighted closet and small teacher's closet.

(5.) *Interior Finish.* — Above basement, similar to school-rooms, blackboards, 4 by 10 feet, back of teacher's desk. Walls and ceilings painted in oils. A basement room may have salt-glazed brick walls up to 7 feet and whitewashed brick above. The floor of wood.

(6.) *Tile.* — The floor space occupied by the ranges and the wall space back of them (include sides if in recess) to a height of 7 feet, unglazed red tile or salt-glazed brick. (For all this see drawings.)

(7.) *Fittings.* — (*a.*) *Work benches*, accommodating 28 pupils, fitted with compartment for utensils, bread-board, etc., a Bunsen burner with a hinged iron grill over it, set on aluminum plates at each station; benches arranged in the form of ellipse, or oblong, with access to centre from two sides; top of pine 26 inches wide; open underneath and supported on pipe standards. One section detached and fitted as a demonstration bench; a clear space of 4 feet all around. Dining table (furnished under another contract) is to be set in centre. (See drawings.)

(*b.*) *Dresser.* — Ten feet long, in 3 sections, 4 adjustable shelves and glazed sliding, or hinged, doors at top; one set of 3 drawers and 2 cupboards on lower part.

(*c.*) *Fuel-box.* — In 2 compartments, each about 24 inches square and 30 inches deep, with hinged lids; small shelf in one section. Buildings having cooking-rooms should have special accommodations in the main coal-room for a supply of range coal and kindling wood.

(*d.*) *Bookcase.* — Similar to those provided in class-room.

(*e.*) *Sink.* — Soapstone, or enamelled iron, 5 feet long; 2 cold and 2 hot-water cocks; drip shelves 24 inches long at each end of sink. Sinks should be near ranges.

(*f.*) *Hot-water Boiler.* — (See instructions in plumbing.)

(*g.*) *Coal and Gas Ranges.* — A six-hole coal range and a similar gas range with hood provided and set on a hearth previously mentioned.

(*h.*) *Refrigerator.* — Will be a part of the furniture. Furnished under another contract.

KINDERGARTEN.

(1.) *Size.* — The rooms can be contained in the space of a class-room and wardrobe, but a slightly larger area is desirable. They comprise a large room, a small room, a supply closet, wardrobe, teachers' closet and a water-closet and bowl or sink.

(2.) *Light.* — Windows should be as in a class-room, if on a corner, on both sides. Exposure should be sunny. Artificial light of the class-room type, arranged for the different rooms.

(3.) *Heat.* — Heat and ventilation as in class-rooms.

(4.) *Large Room.* — The large room should take a 16-foot circle, regulation lines painted on the floor, with at least 4 feet all around it when doors are open into small room.

(5.) *Bookcase and Blackboard.* — Like a primary class-room.

(6.) *Small Room.* — About 200 square feet, with a blackboard opposite window, and wide doors opening into large room.

(7.) *Wardrobe.*— Hooks for 60. Arranged as in ordinary wardrobes.

(8.) *Teachers' Closet.*— For clothing of two or three teachers.

(9.) *Toilet-rooms.*— With seat and bowl or sink.

HIGH SCHOOLS.

CLASS-ROOMS AND RECITATION-ROOMS.

High school class-rooms are laid out for classes of 36 or 42, generally the latter. A standard grammar class-room, 26 feet by 32 feet, will accommodate 42 high school desks. The large class-rooms are to accommodate from 60 to 80 pupils; the larger number can be accommodated in a room 33 feet 8 inches by 43 feet. Recitation-rooms, which to a certain extent will be used also as class-rooms, should be about 16 by 26. These rooms, if equipped with continuous desks and seats as in a lecture-room, or with double desks, such as are to be used in the Charlestown High, would accommodate about 30 pupils each.

ASSEMBLY HALL.

For a high school would not differ materially from that already described for elementary schools.

MASTER'S AND TEACHERS' ROOMS.

For accommodation of the principal there should be an outer office, that is a waiting-room or reception-room, and an inner office; and rooms for both men and women teachers, which might well be concentrated in the neighborhood of the reception-room and the principal's room. The School Committee now have under consideration a change in the organization of high school teachers, which may require a modification of the arrangement of the offices.

LECTURE-ROOM.

(1.) *Size.* — Area to depend on number of seatings required or number of pupils in classes; should be large enough for two classes and should occupy a position between the laboratories for physics and chemistry.

(2.) *Light.* — As much glass area from the rear as possible.

(3.) *Heating and Ventilation.* — In the same proportion as for class-rooms.

(4.) *Equipment.* — Fitted with demonstration table adapted to experiments both in chemistry and physics, containing drawers, locker, a pneumatic sink at end, supplied with hot and cold water under reduced pressure, and cold water under street pressure for quick filling; steam supply direct from boiler main with a by-pass to summer boiler; gas hose connection, gas air suction, and two forms of electric current: first, a direct current of 110 volts E. M. F. and 30 ampere capacity; second, a direct current derived from a motor generator at an E. M. F. of 5 volts minimum and 20 volts maximum, by means of field regulator, which shall be located conveniently to the table; capacity of generator to be one kilowatt at maximum E. M. F.; third, an alternating current of 110 volts E. M. F. and 12 ampere capacity. A 50 ampere ammeter with three shunts and three throw switch and a 125 volt voltmeter, each instrument with long scales and illuminated dials, and mounted on swing brackets in full view of class and instructor. A stereopticon with a reflectoscope and receptacles for same at end of table and at rear of room. These currents should be controlled under table. Over demonstration table, secured to ceiling, provide a plank with heavy screw hooks. Provide a hood with exhaust ventilation. Behind lecture table provide sliding blackboards and a canvas curtain on a heavy spring roller for attaching charts. Provide a screen at side of room for stereopticon projections, the size to depend on distance and lenses used. Hang black opaque curtains over each window, sash, door glass, and skylight for complete cutting out of all light when they are drawn. Control the artificial lighting of room at demonstration table. Lifting seats with desk for taking notes, arranged on platforms, so that the successive rows will rise one above the other to insure an unobstructed view of demonstration table. (See drawing.)

CHEMISTRY.

The Rooms in General Required. — Laboratory, separate from lecture-room, may be used as recitation-room, but better to use lecture-room and keep laboratory free from desks and demonstration table. Lecture-room, separate from laboratory, but easy of access, may be used for recitation, in that case should have facilities for demonstration. Combined lecture-room for physics and chemistry admissible. Three rooms for administrative purposes, store-room for dry chemicals and apparatus, room for storage of liquid chemicals and preparation of re-agents, which may also be used as teacher's laboratory, and an office.

CHEMICAL LABORATORY.

(1.) *Size.* — Should accommodate from forty to fifty pupils. Three sections of forty to fifty each should have accommodation for apparatus.

(2.) *Light.* — On two sides.

(3.) *Heating and Ventilation.* — On same basis as for class-rooms, but removal of gases should also be provided for by a hood, each compartment of which should be ventilated by 9-inch hole at top, venting into elbow or T of drain pipe, thence connected by drain pipe into main flue, in which should be a fan operated by a motor.

(4.) *Walls and Ceiling.* — Walls of brick ideal, but not generally feasible, except on outside walls; plaster walls painted in oils and ceiling of plaster, covered with water resisting surface containing no lead. All woodwork to have natural finish, except tops of desks.

(5.) *Floor.*—Preferably of concrete, may be of hardwood in narrow strips, filled in by asphalt, should slope very slightly between desks, interspaces again trending to common corner, which may be drained.

(6.) *Equipment.* — Working desks at right angles to greater length of room, in sections back to back between windows; section movable when top is removed. Each section 21 feet to 24 feet 6 inches long, 2 feet wide, 3 feet to 3 feet 2 inches in height. Distance between double sections about 5 feet, same distance at least between ends of sections and hood, which should be opposite longer line of windows and at right angles to direction of desk sections. Other ends of sections near enough to wall to allow for drain at right angles to sections and under windows. Desks to be of ash or any durable wood, natural finish. Top of narrow pine strips, treated with aniline black and waterproof lead finish. Individual desks provided with 3 lockers and 3 sets of drawers each, each set of drawers operated by bar from locker, combination lock to fasten locker. Each double section of desks provided with soapstone sink, placed between sections and flush with section top, which should slope slightly to sink. Sink 8 inches at least wide and should begin within 1 foot of the end toward hood, depth here to be 6 inches, running nearly to other end, where depth should be 8 inches. Each pupil to have working space of 3 feet 6 inches by 1 foot 8 inches. Each double section of desks provided with shelf for re-agents, running length of desk, 10 inches to 12 inches above desk, supported by metal standards at suitable intervals, of white wood, $1\frac{1}{4}$ inches thick, 9 inches wide, natural finish, covered with glass plates $\frac{1}{4}$ inch thick, 9 inches wide, suitable lengths, clamped to wooden shelf with as few clamps as possible. Wooden shelf at free end of each section, 1 inch to $1\frac{1}{2}$ inches thick, 3 feet to 4 feet long, not over 1 foot 3 inches wide, height of 2 feet 8 inches to 2 feet 10 inches, for holding blast lamps, re-agent jars, etc. Finish of top of shelf in aniline black. Floor space under second row of windows taken up with line of extra desks, built like sections, furnished in similar way, but without necessarily a drain, to be used for emergency or general utility. Wall space not otherwise occupied may be used for shelves or cabinets. Fixed slate blackboards at end opposite second set of windows and parallel to desk sections, sliding slate blackboards above hood. Liquid waste may be thrown into desk sink, dry waste into earthern jars. Hood should run at right angles to desk sections and along wall opposite free ends of sections. In the construction of hood, protection against fire should be considered. Should be built against brick wall. Floor of hoods to be of slate; wood, inside and outside, to be finished natural. Space divided into 3 or 4 compartments, closed by sliding windows. Space against wall not occupied by hood for general sink.

(7.) *Gas.* — Lead from gas main at free end of centre of double desk sections, branch into 2 leads along back of each section. Take-offs between each working desk-space in form of pillar with two $\frac{1}{4}$-inch cocks, at each end desk a single cock. Two $\frac{1}{4}$-inch gas nipples at each side of each compartment of hood. Cocks of these outside of hood. Wall desk fitted with single gas taps at intervals of 2 feet.

(8.) *Water.* — Lead from water main at free end of centre of double desk sections. Size, large enough to fill section sink rapidly. Lead of ordinary size along length of section underside of shelf, take-off at free end of section, to which blast and suction pump may be attached. At junction of each four working desk spaces take-off, carrying two valves with hose bibb delivery $\frac{3}{4}$-inch, the two valves or cocks facing opposite sides. Suction pump attached to these bibbs if desired.

(9.) *Drains.* — Section desk sink to have open drain and mercury arrestor, into which should be set movable concave netting of wide mesh to arrest larger solid matter. Main desk drain at right angles to sections along and under windows, between windows and sections should be in form of wooden trough, in sections dovetailed from 6 inches to 8 inches inside diameter and equally deep, covered with asphalt paint or filling; may be supported on brackets against wall and left open, or covered and provided with movable top. Into this drain will dip the lead pipes coming from section sinks. Slate floor of each hood compartment should deepen slightly in centre, where there should be a hole 1 inch in diameter, into which is fitted short lead drain pipe, closed by perforated plug; drain pipes to be connected with sloping drain pipe, open or closed, running toward and delivering into general sink.

(10). *Electricity* — Current of electricity on section desks, need not exceed ten volts, may be supplied from source common to physical and chemical side. Plugs between each working space placed under desk top on frame.

LECTURE AND RECITATION ROOM.

(1.) *Size.* — Should contain seats for 100, may be used in common with physics.

(2.) *Light.* — Not usually practical to have overhead light, generally from sides or front. Provision made for darkening room with dark curtains beside regular shades. Electric lighting at top and sides.

(3.) *Heating and Ventilation.* — As for class-rooms, with extra ventilation to remove fumes. Space at left end of desk provided with register and flue of at least 10 inches diameter, to afford means of down draught. Flue carried under floor to nearest wall, flue and draught actuated by motor, if not sufficient.

(4.) *Equipment.* — Lecture table, not less than 12 feet long nor more then 3 feet, nor less than 30 inches wide, height 32 inches. Placed

4 feet distant from wall, material same as that of room, top made and finished like laboratory desks. Trough at right hand of desk of soapstone in 2 depths. Not to exceed 30 inches long, 20 inches wide. Depth, 4 inches to 6 inches minimum; 16 inches to 18 inches maximum. Length of minimum depth not to exceed 60 per cent. of total length. Trough to be depressed in table and provided with flush cover. Trough to have screened drain with mercury trap and overflow. Sliding blackboards of slate at rear of desk, number and size depending on joint needs of chemistry and physics, not less than 50 square feet for chemistry. Drawers and closets for lesser lecture apparatus and chemicals in body of table, wall on either side or under blackboard provided with shelves for re-agent bottles under glass, and side wall provided with cabinets for larger pieces of permanent apparatus, if there is no special room for this. A lantern should be provided. Seats should be in tiers and fitted with a movable arm.

(5.) *Gas.* — Gas taps not to exceed 6 in number. Single ¼-inch taps at intervals of 2 feet or grounded in pillars of 2 cocks at intervals of 4 feet. Taps should be at front of desk.

(6.) *Water.* — Lead from water main of sufficient size to fill trough rapidly from bottom; 2 faucets or goosenecks with ¾-inch hose bibbs, to one of which combined blast and suction pump may be attached; ¼-inch water tap at front left corner of trough, controlled by valve to supply cooling water for distillation.

(7.) *Electricity.* — The provision made for electricity for physics will be sufficient for chemistry.

ADMINISTRATIVE FACILITIES.

(1.) *Apparatus Storeroom.* — Should give ample space for storage of extra and reserve apparatus, and original packages of stock chemicals. These should be kept in dust-proof cabinets with glass doors and in drawers.

(2.) *Preparation Room.* — This should adjoin the above. Primarily for storage of liquid chemicals in bulk and preparation of liquid re-agents, and storage of supply bottles, also fitted for teacher's laboratory. Should have wide centre table with gas in centre, working desks, with drawers and closets along two sides, also gas, water, sink, blast, suction, steam and electricity. Shelves along desks for storage of liquid chemicals, supply bottles and smaller re-agent bottles. An adequate hood should be provided.

(4.) *Office and Balance Room.*— Adjoining storeroom and preparation-room should be small room to contain desk, book shelves, table, and a good grade balance.

PHYSICAL LABORATORY.

(1.) *Size.* — In a space about 30 by 40 feet. A laboratory, apparatus-room, and shop.

(2.) *Light.* — The same basis as for class-rooms, one wall having as direct a southern exposure as possible for *porte lumiere* studies. Artificial light, as in a class-room.

(3.) *Heating and Ventilation.* — On same general basis as for class-rooms.

(4.) *Equipment.* — Small laboratory tables, to accommodate two or four pupils at each, built of hard wood, cherry tops, fitted with 4 drawers, supports and adjustable cross-bar. Wall tables around room on sides where there are windows, with one or two shallow drawers under, but not deep enough to interfere with comfort of pupil. Drip sinks with cold water to be provided at these tables, one to every six or eight pupils. Instructor's table, fitted with hot and cold water, Richards pump, numerous cupboards and drawers of various depths and widths. Two-inch plank bolted to ceiling over this table, with space of 2 or 3 inches between plank and ceiling, for attachment of pendulums and other apparatus.

(5.) *Furniture.* — Provide adjustable stools for all the tables and a sufficient number of tablet arm chairs to accommodate the entire division during demonstration exercises. Chairs to be placed in rectangle formed by pupils' tables and demonstration table.

(6.) *Electricity.* — One outlet for direct current at 110 volts E. M. F. and 30 ampere capacity. One outlet for direct current at low voltage with regulator conveniently located. One outlet for alternating current at 110 volts E. M. F. and 12 ampere capacity. One outlet for each kind of current at each demonstration table, to be single pole push plugs instead of binding posts. Series and multiple connections at each pupil's table. Switch in laboratory to cut out pupils' tables.

(7.) *Gas.* — Pupils' tables to be equipped with gas, 2 or 4 cocks to each table. Wall tables to be equipped with gas. Demonstration table to be provided with gas.

(8.) *Bulletin Board.* — 25 to 50 square feet of bulletin board covered with burlap, secured at edges, but not glued on like wall paper.

(9.) *Blackboards.* — As much blackboard space as possible.

APPARATUS ROOMS.

(1.) *Size.* — One large or several small rooms, to open directly out of laboratory.

(2.) *Equipment.* — To be fitted with dust-tight cases with adjustable shelves and sliding glass doors, extending not higher than a man's reach; cabinets of drawers of various widths and depths, mostly narrow and shallow. Some of these cases may be in the laboratory, if there is sufficient wall space.

SHOP.

A small shop is desirable, though not absolutely necessary. This should be eqipped with work-bench, power lathe, belted to motor generator, and shelving for tools and stock.

BOTANICAL AND ZOOLOGICAL LABORATORY.

(1.) *Size.* — In a space about 30 by 40 feet. Laboratory and apparatus room.

(2.) *Light.* — Windows the same as for class-rooms, one wall with southern exposure. Artificial light as in class-rooms.

(3.) *Furniture.* —Forty-two adjustable screw revolving chairs.

(4.) *Equipment.*—Twenty-one pupils' tables, 54 inches by 24 inches by 30 inches high, each to accommodate two pupils, to have plate glass tops; if stereopticon is to be furnished, provision should be made for darkening room with dark curtains besides regular shades. Soapstone sink, 72 inches by 30 inches, 10 inches deep, accessible on all sides. Supply with cold water, about 8 bibbs, and 2 hose bibb cocks. One aquarium, 30 inches long, 20 inches wide and 20 inches high, with supply, gooseneck cock with aspirator and standing waste. Ice chest, 36 inches by 24 inches. Cases built wherever practicable. Three sections to contain 42 pigeon holes, 3 inches by 3 inches by 8 inches, for storage of instruments. A liberal supply of cases to contain drawers and cupboards in lower compartment, and shelves above for exhibition of specimens, storage of material, instruments, books, charts, etc.

GYMNASIUM AND DRILL HALL.

(1.) To be used in common for gymnasium exercises, athletic games, and the drilling of the school cadets. On account of its size and for structural conditions, to be generally located in the basement, directly under the assembly hall, with clear span of ceiling and combined height of basement and first story, with visitors' gallery generally provided, but not essential, at one end at same grade and entered from first floor.

(2.) *Size.* — The classes exercising in the gymnasium are generally about 50, and a suitable floor space for this number and a full company of cadets at drill is from 3,000 to 3,850 square feet. The height should be not less than 24 feet.

(3.) *Light.* — Ample outside light in all cases.

(4.) *Heat and Ventilation.* — The former sufficient to guarantee a temperature of about 60 degrees, and about twice as much ventilation as is customary for the ordinary class-room. This is, of course, insufficient for the number of people who might occasionally occupy the gymnasium for exhibitions, but it is more than enough for the ordinary number using it for class exercises.

(5.) *Equipment.* — The gymnastic apparatus consists of the following fixtures, which are slightly modified in the different schools :

2	Brooms.
6	Bar saddles.
16	Sections bar stalls.
16	Bar stall benches.
12	Climbing ropes.
2	Inclined ropes.
1	Vertical ladder.
6	Rope ladders.
1	Buck.
1	Pair basket ball goals.
3	Regulation basket balls.
2	5 by 6 Mats.
2	5 by 15 Mats.
6	Pair 1½ lb. Indian clubs.
40	Pair ¾ lb. Indian clubs.
1	Slanting ladder.
6	Balance beams.
1	Pair jump standards.
8	Chest weights.
1	Horizontal and vaulting bar.
1	Pair parallel bars.
2	Jump boards.
6	Travelling rings.
1	Pair flying rings.
1	Spirometer.
1	Shoulder caliper.
2	Medicine balls.

(6.) *Gun Racks.*— Racks for holding the guns carried by the cadets should be provided on wall.

(7.) *Special Rooms.* — Adjoining gymnasium and drill hall two small rooms about 10 feet square should be provided for school matron and director of gymnasium.

(8.) *Dressing Rooms, Baths and Lockers.*— (*a.*) In the high schools under construction the Board is experimenting with the following system, which has been tried with success in many outside gymnasiums.* This consists in keeping all the clothing of all the pupils in a central locker room, each set being numbered and all being under the control of the attendant in charge. Dressing rooms are provided in a number equivalent to the number of a class. A class coming for exercise is given their gymnasium clothing and keys to dressing-rooms, which they lock behind them when exercising. Returning, they can be given the opportunity to take a shower bath in a large room fitted with individual showers, arranged in three banks for different temperatures, all turned on at once by the attendant if a class as a whole is bathing. Returning, the class give up the keys, but leave their gymnasium clothing to be gathered up by the attendant. The clothing is carried to the dry-room, and when dried each set is put back in its proper pigeon hole.

(*b.*) The locker room contains pigeon holes, 10-inch cube, one for each pupil in the school, contained in a room completely controlled by the attendant. Beside this there is a counter over which to deliver the clothing, and adjoining this the dry-room, capable of being heated to a high temperature and thoroughly ventilated.

(*c.*) The dressing rooms are small cabins, about 3 feet square, with a locked door, a seat and hooks. The shower baths are 3 feet square, divided by slate partitions, similar to those for water-closets, each having a bar at the front, over which a cotton sheet can be dropped. Each compartment has two sprays in opposite corners.

HANDICRAFT ROOMS.

On account of the varying needs of different localities it seems unwise to have a uniform course in manual training in high schools. With this in mind the following minimum equipment is suggested, to be added to as special occasions arise:

(1.) *Size.* — A space 30 by 40 feet appears to be ample for this work.

(2.) *Light.* — Windows and artificial light as for a class-room.

(3.) *Equipment.* — Twenty 36-inch manual training benches fitted with 2 vises, 1 to be a quick action iron vise; wall bench fitted with 10 stations; 10 Prentiss iron vises, 3½-inch jaw; 10 tool drawers and 5 Bowers tool holders; 1 pair Federal bench shears; ¼-inch gas hose cock terminal above each bench station; 2 gas blast burners, 1 large, 1 small; the blast burners and blow pipes to be accompanied by metal tray and ventilating hood; bench drill; metal beating anvils according to approved patterns; sink; polishing lathe and bench No. 1 C, 4 by 28-inch grindstone mounted in iron trough; speed lathe 8-inch single arbor; 8-inch bench saw; these four run by power; cases for work in process, instruments, etc., room for storage of lumber and other supplies.

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*This system has not been installed anywhere, and consequently has not been tested.

HOUSEHOLD SCIENCE.

(1.) *Size.* — The space should be about 30 by 40 feet, and should accommodate the kitchen, two small rooms for showing the care of a dining-room and of a bedroom, and a china-closet and pantry.

(2.) *Light, Heat, etc.* — The same as that for other rooms, with additional ventilation in the kitchen.

(3.) *Equipment.* — The kitchen to contain the same equipment as that for grammar school cooking-rooms, but for 24 stations only; a kitchen pantry fitted with shelving and a china-closet fitted with a sink; drawers, cupboards and shelves enclosed with glass doors. The dining-room and bed-room simply finished rooms, having no equipment except the furniture.

DRAWING-ROOM.

(1.) *Size.* — The size should be about 30 by 40, and is preferably divided into two drawing-rooms with a work-room between.

(2.) *Light.* — Light preferably from the north. This is not a necessity except for the room in which drawing is done from models.

(3.) *Equipment.* — Will include cases for drawing boards, for models and stock, and a bookcase, the details of which are given in Appendix XI., a small sink, with hot and cold water.

LUNCH–ROOM.

(1.) The lunch-room equipment in high schools will depend largely upon the location of the school. If the pupils come from a distance and a large proportion of them stay for the noon hour, the Board puts in a lunch counter, equipped so that simple food can be served hot and fitted with conveniences for washing up. This is generally managed by arrangement with outside caterers.

LIBRARY.

(1.) A space equivalent to a small class-room is ample for library purposes. The book accommodation will depend somewhat on the size of the school. The library is planned as a reading-room, that is, with the books in the room and not in a separate stack-room.

WARDROBES.

(1.) In high schools a common wardrobe is advised for all the clothing, situated on the lower floor to avoid bringing dirt into the upper floors. There being an attendant on the lower floor the room as a whole can be locked up.

(2.) *Light.* — The room should have outside light.

(3.) *Heat and Ventilation.* — It should be thoroughly well heated and ventilated.

(4.) *Equipment.* — The poles, hooks, etc., will be similar to those used in the other schools.

HEATING, VENTILATION AND ELECTRIC SYSTEMS.

HEATING AND VENTILATION GRAVITY SYSTEM.

(1.) *Heat-ducts for School-rooms.*

(*a.*) *Location.* — In a corner room, locate the duct within 10 feet of the outside wall. In a room with one outside wall, locate the duct on the inside wall, near the middle.

(*b.*) *Size.* — Allow one square foot area of duct for each nine occupants. The opening into the room is to be the same area as the duct. The bottom of the opening is to be about 8 feet above the floor. Galvanized-iron deflectors, painted to match the adjoining walls, will be placed in each opening. In addition, there will be a galvanized-iron ground around the opening.

(2.) *Vent-ducts for School-rooms.*

(*a.*) *Location.* — In a corner room, locate the duct at the inside corner of the room, and where possible on the same wall as the heat-duct. In a room with one outside wall, the duct is to be on the same inside wall as the heat-duct, and as near the middle as possible.

(*b.*) *Size.* — Allow about one square foot area of duct for each ten occupants. The opening into the room will be at the floor, and will be the full size of the vent-duct. There will be no guard at the opening. The floor will be carried into the bottom of the duct, and the baseboard will be carried in and around. The inside of the duct, exposed to view, will be plastered and finished, to match the adjoining walls.

PLENUM FAN SYSTEM.

(1.) *Heat-ducts for School-rooms.*

(*a.*) *Location.* — In a corner room, locate the duct within ten feet of the outside wall. In a room with one outside wall, locate the duct on the inside wall, near the middle.

(*b.*) *Size.* — Allow one square foot area of duct for each fourteen occupants. The opening into the room is to be one-third larger than the area of the duct. The bottom of the opening is to be about eight feet above the floor. Galvanized-iron deflectors, painted to match the adjoining walls, will be placed in each opening. In addition, there will be a galvanized-iron ground around the opening.

(2.) *Vent-ducts for School-rooms.*

(*a.*) *Location.* — The location and size will be the same as those for the Gravity System.

EXHAUST FAN SYSTEM.

(1.) *Vent-ducts for School-rooms.*

(*a.*) *Size.* — Allow about one square foot area for each sixteen occupants. The other details will be the same as for the Plenum Fan System.

TOILET–ROOM. VENTS.

(1.) *Duct.* — Allow 12 square inches of duct area for each closet and for each 16 inches in length of urinal space.

(2.) *Opening.* — Each door into the toilet-room is to have an opening either in the lower panel with a register face on each side or underneath the door. The net area through the opening in either case is to be equal to the area of the main vent duct from the room.

WARDROBE VENTS.

(1.) * *Duct.* — Each wardrobe is to have a vent duct with an area of 1⅔ square feet and having registers at the top and bottom of the room.

(2.) *Opening.* — The door leading into the wardrobe at the end farthest from the vent-duct is to have an opening similar to that for a toilet-room so that the air can pass from the school-room into the wardrobe and thence out through the duct.

ELECTRIC WORK.

(1.) *Service.* — This should enter basement underground at location to be determined by reference to Edison mains and building arrangements. Main switch, cut-outs and meter should be located as close to service as possible and placed in a cabinet.

(2.) *Conduits.* — All wires to be run in an iron conduit concealed, except conduits for mains in basement, and side outlets in boiler, engine and stack-rooms. Tap circuit conduits to be run above rough floor wherever possible. If floor construction will not allow this they are to run below floor beams and above ceiling, a space of 2 inches being left in which they can be run.

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* This would be modified if the Chicago system of wardrobes is adopted.

(3.) *Wire Slot.* — Near each end of a large building, or near the centre of a small one, either an open shaft at least 24 inches by 30 inches, or a slot in wall 4 inches deep and 18 inches wide, should be provided from a point 4 feet below basement ceiling to a point above ceiling of top floor.

(4.) *Cabinets.* — All cabinets to be furnished by wiring contractor, but finished by the general contractor.

(5.) *Cutting.* — All cutting and patching to be done by the general contractor.

(6.) *Outlets.* — Class-rooms to be provided with 6 four-light ceiling outlets, controlled by two switches, and one light for teacher. Wardrobes to have 1 two-light ceiling outlet, controlled by switch in class-room. Corridors to be lighted from ceiling wherever possible. Height of side outlets in rooms to be 6 feet, and in corridors 6 feet 4 inches. Switch outlets to be 4 feet. Switches in corridors, play-rooms, and pupils' toilet-rooms to be operated by private key.

(7.) *Fixtures.* — Fixtures in class-rooms to be of special design to combine a direct and diffused light.

(8.) *Gas.* — Gas outlets to be provided in all corridors, vestibules, stairways, boiler-room and assembly hall exits; all except vestibule to be wall outlets. Gas-piping to be included in the Engineer's work.

(9.) *Stereopticon.* — All grammar halls and high schools to be provided with an electric stereopticon and reflectoscope.

(10.) *Clocks and Bells.* — All schools to be provided with a system of clocks, operated by a master clock. All primary schools to be provided with a system of signal bells, operated by push buttons. In all grammar and high schools the bell system to be operated automatically by master clock, according to prearranged programme.

(11.) *Telephones.* — In all schools, each class-room, hall, teachers' room and boiler-room to be connected to master's office, or to room occupied by the first assistant, by a telephone system.

NOTE. — Drawings showing special fittings for both plumbing and interior fittings will be found in Appendices XI., XII., and XIII.

VI.

FINANCIAL STATEMENT.

The original appropriation of $5,500,000, available under chapter 473 of the Acts of 1901, and chapter 386 of the Acts of 1902, and the $1,500,000 available under chapter 392 of the Acts of 1905, has been practically exhausted by the completion of the Charlestown High and the Normal and Girls' Latin Group. All the buildings of this latter group are under way, and the Model School will give a temporary home for the new High School of Commerce. There was not sufficient balance left to enable the Board to build the extension to the Mechanic Arts High School, but there is sufficient to enable them to purchase land in various parts of the city where additional school accommodation is now required or will be required in the near future. As has already been stated in the report, nothing is so important for the proper administration of the work of the Board as permanent provision for the erection of buildings which may be counted upon regularly year by year, and in accordance with which the Board may make their plans a reasonable time in advance and so have the buildings ready to meet conditions which can always be anticipated a year or two beforehand.

The bill presented to the Legislature asks for such permanent provision, and will leave it with the School Committee to determine year by year how much money, not in excess of certain fixed sums, is needed for the new work of the year, and the sums not expended will be cumulative, so that the Board may intelligently plan its work. This bill by no means takes away from the City of Boston the right to appropriate additional sums for this purpose from the tax levy, but successive administrations have agreed in thinking that such charges as permanent buildings of first-class construction should not be taken out of the current expenses of the city. As already stated, New York, Chicago and St. Louis have expended on new buildings respectively $8,000,000, $1,800,000 and $800,000 per annum. Reducing all to Boston's population of 600,000, it would mean that New York spends about $1,333,333, and Chicago $600,000, and St. Louis $800,000, and it seems not unreasonable that Boston should spend in the same way, year by year, for a similar purpose.

VII.

CONCLUSION.

The standards of cost and accommodation have not as yet been changed, although there has been a considerable rise in material and labor in the last twelve months, and the Board feels that, on the basis of the accommodation that has proved satisfactory in the past, the standard of cost as laid down by it is fairly accurate. If, as intimated earlier in the report, there is a movement toward cutting down the size of the class-rooms, this will decrease the cost per class-room, but not the cost per head, and of course it will increase the cost of teaching. As an offset to this additional expense the adoption of some such system of wardrobes as that about to be tested in Chicago would be an economy of space.

As to the Board's relation to its architects and their selection, the Board believes that it must either continue to select, as it has done in the past, from the men who are most competent in their profession, and, distributing the work, face constantly the trouble of having to go over again in detail that with which some architect who has already built for the Board is perfectly familiar, or else the system of Chicago or St. Louis must be adopted and the Board must itself take charge of all the architectural work. It would require a large and thoroughly equipped department to turn work out as well and as rapidly as the architects have done for the Board. If, however, there is a permanent appropriation and a system of work going on year by year the establishment of such a department would be fully justified.

The relations of the Board with contractors have only confirmed its feeling that a single contract for all trades is the most advantageous for this Board, but it has, under the system of advertising, very distinct drawbacks, as it leaves the Board with little or no choice in regard to sub-contractors, whose work may be of the most important kind. On the other hand, without single contracts it is almost impossible to have work executed with reasonable despatch. The Board believes that it is desirable that at least the bulk of this work should be done in Boston, and done under the good conditions which prevail here, but it would strongly deprecate and oppose any attempt to have this forced upon it, nor can it reasonably object to a sub-contractor simply because his shop is outside the limits of Boston, provided it is within reasonable distance for the purpose of inspection.

The chief evils connected with the single contract for a whole building lie in the encouragement of companies or corporations, which often are not strictly representative of any portion of the building trade, and which more nearly approach the position of broker or middleman, who get bids and manage the operation. This method tends more and more to put the owner out of touch with the actual mechanic.

The advantages of a single contract are so obvious, however, that it would appear to be essential that some way should be devised whereby the city can have its work done in this way and yet have some control over the sub-bidders. In private work this can sometimes be done by having the important branches of the work estimated beforehand by invitation and awarded provisionally to the low bidder by being inserted in the final specification. This need not interfere with advertising for these preliminary bids, but the character of the bidders could be taken into consideration in awarding.

In December, 1905, the Hon. Joseph J. Corbett, having been appointed Associate Justice of the Municipal Court, Charlestown District, resigned from the Board January 2, 1906, his resignation taking effect March 16, 1907. He had served since June, 1903, and with his long experience in public affairs, his sound judgment and his well-balanced mind was of great service to the Board, guiding its policy and handling with discretion the various semi-legal difficulties with which the Board is called upon to grapple. His loss has been keenly felt.

In making acknowledgment to those who have assisted the Board this year in its work the Board feels that especial thanks are due to the various members of the new School Committee, individually and as a body, and to the Superintendent and the Assistant Superintendents. Never before since the Board was established has there been such close, intimate relationship between the educational authorities in the School Committee and this Board, and it has been of very great advantage in handling the work. To the masters the acknowledgments of the Board are due for their constant and hearty support and for their competent advice in connection with all matters pertaining to their own districts. To those who have helped the Board in a special way our thanks are due — to Professor Sanger, whose report on chemical laboratories is appended, to Doctor Cotton, who has continued the admirable service that he has done in the past in connection with the furniture, and to Doctor Standish, who has helped us on matters connected with artificial light and its effect on the eyes. The Board regrets the loss of Professor Chandler, whose advice had always been at its service in the past and who was so helpful in many ways.

In conclusion the members of the Board wish to express to your Honor their appreciation of the support that you have given them in the work that has been undertaken this year.

Respectfully submitted,

R. CLIPSTON STURGIS,
CHARLES LOGUE,
THOMAS A. MULLEN,
Commissioners.

APPENDICES.

APPENDIX I.

APPROPRIATION FOR LAND AND BUILDINGS FOR SCHOOLS.

I.

GENERAL STATEMENT.

The following statement shows the expenditures on account of the above appropriation from February 1, 1906, to February 1, 1907:

February 1, 1906, Balance of Appropriation .	$1,653,800 89
Amount received from sale of old buildings .	3,025 00
	$1,656,825 89

EXPENDITURES.

Expended for sanitation:			
Cottage-place School . .		$1,452 03	
Hyde School . . .		14,344 20	
Painting latrines . .		1,063 70	$16,859 93
Amounts expended for fire protection:			
To putting extension bolts on front doors:			
Andrews School,	$31 50		
Common-street School . .	16 90		
Dorchester High School . .	66 93		
Gaston School .	40 75		
Phillips-street School . .	28 00		
Polk-street School . .	37 45	$221 53	
To fire gongs:			
Hawes Hall and Simonds School	$114 76		
Sharp School .	50 10		
Skinner School .	49 65	214 51	
Carried forward . .		$436 04	$16,859 93

Brought forward		$436 04	$16,859 93
To fire-proofing cellar stairs:			
Sharp School		93 00	
Fire extinguishers		128 40	
Fire escapes:			
Agassiz School	$179 55		
Sharp School	1,765 00		
Tileston School	150 00		
		2,094 55	
			2,751 99
Expended for sites, erecting, grading and planting of lots and furnishing of new buildings:			
Addition, Dorchester High School:			
Building			1,800 00
Charlestown High School:			
Building			204,638 42
Elementary School, Bennett District:			
Site (Advertising)			28 70
Extension, Mechanic Arts High School:			
Building			8,163 68
Grammar School, Dearborn District (Dearborn School):			
Building		$51,053 72	
Furnishing		3,614 35	
			54,668 07
Grammar School, Old Gibson Site (Oliver Wendell Holmes School): (Total cost of site, building and furnishing, $225,204.80.)			
Building		$173 83	
Furnishing		393 30	
			567 13
Grammar School, Washington Allston District (Thomas Gardner School):			
Building		$1,958 53	
Furnishing		203 00	
			2,161 53
Normal and Latin School Group:			
Building			311,954 27
Primary School, Glenway Lot (William E. Endicott School): (Total cost of building and furnishing, $89,530.30.)			
Building		$18,893 09	
Furnishing		2,482 42	
			21,375 51
Carried forward			$624,969 23

Brought forward		$624,969 23
Primary School, Henry L. Pierce District (John Greenleaf Whittier School):		
(Total cost of site, building and furnishing, $92,865.90.)		
Building	$2,554 19	
Furnishing	79 30	
		2,633 49
Primary School, Howard-avenue Lot (Nathaniel Hawthorne School):		
(Total cost of clearing site, building and furnishing, $77,217.48.)		
Building	$41,198 63	
Furnishing	1,853 30	
		43,051 93
Primary School, Hugh O'Brien District (Samuel W. Mason School):		
(Total cost of site, building and furnishing, $150,927.44.)		
Building	$472 36	
Furnishing	161 00	
		633 36
Primary School, Lewis District (Sarah J. Baker School):		
(Total cost of site, building and furnishing, $205,241.61.)		
Building	$26,008 90	
Furnishing	3,423 70	
		29,432 60
Primary School, Tuckerman Lot:		
(Total cost of addition to site, building and furnishing, $109,571.18.)		
Building		719 74
Miscellaneous:		
Engineering expenses		8,557 68
Incidental expenses, including salaries, blue prints, engineer supplies, stationery, car fares, and travelling expenses		6,484 74
Total expenditures of 1906–1907		$716,482 77
Amount voted and set aside but not expended to date by Schoolhouse Commissioners for fire protection, engineering and office expenses, sites, construction and furnishing of new buildings		752,600 92
Balance of Appropriation undistributed		187,742 20
		$1,656,825 89

II.

SUBDIVISION OF EXPENDITURES.

Land and Buildings for Schools, 1906–1907.

High Schools	$518,486 12
Primary Schools	101,229 39
Grammar Schools	72,109 13
Not chargeable to any one school	15,042 42
Manual Training Schools	8,163 68
Kindergarten Schools	1,452 03
Total	$716,482 77

III.

Statement of Income, Land and Buildings for Schools.

Amount received from sale of property	$3,025 00
Total	$3,025 00

APPENDIX II.

APPROPRIATIONS FOR RENTALS, FURNITURE, REPAIRS, ALTERATIONS AND EXPENSES OF THE COMMISSION.

I.

GENERAL STATEMENT.

During the year February 1, 1906, to February 1, 1907, the following sums were expended by the Schoolhouse Department for furniture, repairs, alterations, rents and expenses of the Commission:

February 1, 1906, appropriation	$267,400 00
November 19, 1906, additional appropriation .	5,700 00
January 7, 1907, additional appropriation . .	15,000 00
	$288,100 00

General Repairs:

Carpentry, lumber and hardware	$51,259 17
Furniture	33,593 48
Heating apparatus	31,262 28
Salaries of inspectors	12,482 18
Roofing and gutters	11,739 40
Painting and glazing	11,007 25
Masonry, paving and drains	10,560 72
Plumbing	9,664 17
Electric wiring and fixtures	6,643 37
Electric bells and telephone systems . . .	6,296 34
Salaries, Engineering Department . . .	5,364 67
Grading yards and building retaining walls .	5,163 55
Rental and care auxiliary fire-alarm boxes . .	4,991 86
Blackboards, new slates and setting up . .	4,760 37
Gas-fitting and fixtures	3,752 20
Ventilation, galvanized iron work	3,610 30
Asphalting	3,306 78
Iron fences and wire screen work	3,286 42
Whitening and plastering	3,278 35
Printing and postage	2,583 17
Carried forward	$224,606 03

Brought forward		$224,606 03
Automobile expenses		2,545 09
Cleaning buildings and janitors' supplies		1,618 76
Locksmithing		1,543 37
Care of lawns and planting		1,497 57
Electric clock systems		1,461 71
Blackboards, repairs		1,255 51
Travelling expenses		1,182 98
Teaming		962 14
Flagstaffs, new, and care of old		707 28
Electric motors and engines		706 56
Gymnasium apparatus		478 66
Horse keeping		433 60
Rubber stair treads		384 35
Boiler insurance		282 91
Expert services on sale of school buildings		200 00
Plans, blue printing and advertising		121 16
		$239,987 68
Rentals, etc.:		
High school	$11,305 00	
Kindergarten schools	4,643 00	
Primary schools	3,991 00	
Grammar schools	3,229 60	
Evening drawing schools	1,604 67	
Cooking school	407 00	
Manual training schools	400 00	
		25,580 27
Administration Expenses:		
Salaries	$15,930 10	
Rental of offices	4,200 00	
Care of office and electric light,	1,035 50	
Messenger service and telephone,	767 08	
Stationery	392 68	
Repairs and furniture	206 69	
		22,532 05
Total		$288,100 00

II.

SUBDIVISION OF EXPENDITURES.

Rents, salaries, furniture, repairs and alterations in school buildings, from February 1, 1906, to February 1, 1907.

Grammar schools	$96,311 46
Primary	63,411 43
Miscellaneous	58,464 47
Carried forward	$218,187 36

Brought forward	$218,187 36
High schools	46,212 29
Kindergartens	9,245 17
Evening drawing schools	5,131 26
Manual training schools	3,131 99
Cooking schools	2,546 45
Evening elementary schools	2,453 55
Deaf mutes' school	1,191 93
Total	$288,100 00

III.

SUBDIVISION AS TO SCHOOLS.

South End and Back Bay.

Appleton street	$1,018 67	
Charles C. Perkins	811 69	
Cook	497 61	
Dwight	1,371 78	
English High	3,422 16	
Everett	833 70	
Franklin	4,002 91	
Girls' High	4,687 77	
Horace Mann	1,191 93	
Joshua Bates	1,041 01	
Mechanic Arts High	1,673 91	
Normal (Rice Building)	783 40	
Prince	1,270 39	
Public Latin	2,869 33	
Rice	1,535 55	
Rutland street	304 22	
West Concord street	756 80	
		$28,072 83

City Proper.

Andrews	$673 10	
Brimmer	795 63	
Carver street	54 90	
Pierpont	242 34	
Quincy	539 36	
Skinner	321 22	
Tyler street	209 34	
Wait	515 00	
Way street	121 53	
Winthrop	801 60	
		4,274 02
Carried forward		$32,346 85

Brought forward		$32,346 85

NORTH AND WEST ENDS.

Baldwin	$453 93	
Bowdoin	2,451 65	
Christopher Columbus	633 26	
Cushman	738 63	
Eliot	943 11	
Emerson	400 20	
Freeman	137 33	
Grant	486 14	
Hancock	1,292 13	
Hancock Annex	11 35	
Mayhew	747 17	
North Margin street	114 80	
Phillips	945 08	
Paul Revere	845 39	
Pormort	174 47	
Sharp	253 13	
Somerset street	270 79	
Wells	2,024 86	
Winchell	833 63	
Washington	6,430 16	
		20,187 21

ROXBURY, EAST OF COLUMBUS AVENUE.

Aaron Davis	$367 67	
Abby W. May	448 73	
Albert Palmer	594 93	
Asa Gray	269 93	
Bartlett street	480 05	
Dearborn	747 13	
Dillaway	679 84	
Dudley	2,992 74	
Ellis Mendell	561 60	
George Putnam	792 63	
George Putnam Annex	106 61	
George street	485 61	
Howard avenue	519 58	
Howard-avenue Annex	209 71	
Hugh O'Brien	2,089 53	
Hugh O'Brien Annex	95 75	
Hull	451 76	
Hyde	1,354 48	
Lewis	2,212 28	
Lewis Annex	405 97	
Mt. Pleasant avenue	84 90	
Miles Standish	674 65	
Nathaniel Hawthorne	46 05	
Carried forward	$16,672 13	$52,534 06

Brought forward	$16,672 13	$52,534 06
Old Dearborn	2,936 19	
Old Roxbury High	734 17	
Phillips Brooks	1,381 34	
Roxbury High	2,234 55	
Roxbury High Annex	187 90	
Ruggles street	9 00	
Samuel W. Mason	238 31	
Sarah J. Baker	216 46	
Sherwin	2,373 56	
Thornton street	112 75	
W. L. P. Boardman	449 27	
William Bacon	320 39	
Williams	193 95	
Winthrop street (High School of Commerce)	1,886 75	
		29,946 72

ROXBURY, WEST OF COLUMBUS AVENUE.

Comins	$1,509 80	
Cottage place	227 40	
Farragut	359 14	
Heath street	51 25	
Ira Allen	519 82	
Jefferson	806 71	
Lowell	1,073 31	
Lowell Annex	192 83	
Lucretia Crocker	440 01	
Martin	2,247 34	
Old Ira Allen (storehouse)	91 14	
Phillips street	458 87	
Smith street	161 09	
Wyman street	538 80	
		8,677 51

JAMAICA PLAIN AND WEST ROXBURY.

Agassiz	$389 34	
Bowditch	1,326 18	
Canterbury street	53 57	
Charles Sumner	430 11	
Chestnut avenue	111 30	
Francis Parkman	748 23	
Florence street	176 40	
Henry Vane	102 08	
Hillside	427 38	
Longfellow	618 32	
Margaret Fuller	246 15	
Mt. Vernon	2,623 73	
Carried forward	$7,752 79	$91,158 29

Brought forward	$7,752 79	$91,158 29
Old Agassiz	307 92	
Old Baker street	37 49	
Phineas Bates	173 21	
Poplar street	3 50	
Robert G. Shaw	3,374 22	
Stephen M. Weld	475 59	
Washington street (Forest Hills)	115 60	
Washington street (Germantown)	172 25	
West Roxbury High	1,267 79	
		13,680 36

SOUTH BOSTON.

Benjamin Dean	$732 93	
Benjamin Pope	630 30	
Bigelow	846 34	
Capen	413 98	
Choate Burnham	284 73	
Clinch	567 71	
Cyrus Alger	365 51	
Drake	876 88	
Gaston	626 14	
Hawes Hall	646 82	
John A. Andrew	1,160 78	
John Boyle O'Reilly	326 93	
Lawrence	1,564 59	
Lincoln	822 60	
Norcross	1,113 29	
Old Parkman (storehouse)	521 99	
Oliver Hazard Perry	1,122 80	
Parkman	513 99	
Samuel G. Howe	774 09	
Shurtleff	1,844 79	
South Boston High	6,171 88	
Simonds	156 58	
Thomas N. Hart	1,006 61	
Tuckerman	252 25	
		23,344 51

DORCHESTER.

Adams street	$160 80	
Atherton	683 79	
Benjamin Cushing	887 13	
Bailey street	98 46	
Brewster	299 21	
Brewster Annex	78 66	
Christopher Gibson	3,073 85	
Dorchester avenue	746 12	
Carried forward	$6,028 02	$128,183 16

Brought forward	$6,028 02	$128,183 16
Dorchester High	2,666 23	
Edward Everett	650 47	
Gilbert Stuart	725 19	
Glenway	9 10	
Glenway Annex	14 95	
Harbor View street	442 13	
Harris	497 41	
Henry L. Pierce	3,786 22	
John Greenleaf Whittier	97 13	
Little Em'ly	7 44	
Lyceum Hall (storehouse)	213 51	
Marshall	636 83	
Mary Hemenway	2,064 55	
Mather	1,054 25	
Mayflower	5 00	
Minot	815 56	
Old Dorchester High	306 36	
Old Everett	300 85	
Old Gibson	343 29	
Old Mather	209 25	
Oliver Wendell Holmes	702 59	
Quincy street	187 27	
Roger Wolcott	1,606 26	
Roger Clap	362 42	
Savin Hill	270 67	
Stoughton	242 73	
Thetford avenue	582 94	
Tileston	1,418 93	
Walnut street	524 66	
William E. Endicott	161 50	
William E. Russell	918 22	
		27,851 93

CHARLESTOWN.

Adams and Chestnut street	$134 16	
Bunker Hill Grammar	635 59	
Bunker Hill Primary	149 59	
Benjamin F. Tweed	255 50	
City Hall, Charlestown (Evening Drawing)	12 25	
Common street	164 04	
Copley (Charlestown High)	938 18	
Chauncey place	134 23	
Frothingham	586 14	
Frothingham Annex	113 40	
Harvard	1,319 50	
Harvard Hill	336 37	
Carried forward	$4,778 95	$156,035 09

Brought forward	$4,778 95	$156,035 08
Mead street	339 75	
Medford street	433 45	
Polk street	380 53	
Prescott	540 14	
Prescott Annex	59 05	
Warren	716 41	
William H. Kent	70 50	
		7,318 78

EAST BOSTON.

Adams	$1,013 57	
Austin	29 14	
Blackinton	1,068 66	
Chapman	888 07	
Cudworth	951 95	
East Boston High	938 53	
Emerson	1,423 37	
James Otis	370 22	
Lyman	1,839 77	
Noble	333 75	
Noble Annex	37 76	
Old East Boston High	294 16	
Paul Jones	573 88	
Plummer	543 76	
Tappan	205 65	
Webb	124 79	
		10,637 03

BRIGHTON.

Aberdeen	$93 92	
Auburn	176 42	
Bennett	1,061 77	
Bennett Annex	122 25	
Brighton High	3,813 80	
Everett	223 55	
Frederic A. Whitney	337 67	
Harvard	65 53	
Hobart street	42 98	
Old Brighton High	512 50	
Oak square	215 56	
Thomas Gardner	750 13	
Union street	12 50	
Washington Allston	733 46	
Washington Allston Annex	468 90	
William Wirt Warren	232 83	
Winship	1,220 53	
		10,084 30
Carried forward		$184,075 20

Brought forward	$184,075 20
Portable buildings (92)	12,029 64
Incidentals, not chargeable to any one school	33,065 81
Administration expenses	22,532 05
School Committee building	2,036 47

HIRED BUILDINGS, RENTS AND REPAIRS.

Beech-street lot	$125 00	
Bennington-street lot	195 00	
Brooks street, Faneuil	619 21	
Centre street, Dorchester, lot	200 00	
Chambers street, 27	569 30	
Chambers street, 38	761 64	
Chauncy Hall	11,705 36	
Columbus avenue, 147	1,251 98	
Columbus avenue, 1448	2,179 23	
Eliot street, Jamaica Plain	300 00	
Fourth street, 484	652 25	
Greenwood Hall	253 50	
Hewlett street, 17	249 90	
Lauriat avenue, 170	1,239 80	
Parmenter street, 20	1,700 00	
Parmenter street, 32	253 09	
Pearl street, 8, Charlestown	1,056 67	
Saratoga street, 399	376 76	
Tremont street, 238	1,112 94	
Tremont street, 1508	160 50	
Tremont street, 1518	121 10	
Unitarian Church, Roslindale	602 00	
Walk Hill street, 727	62 00	
Warrenton street, 63 and 63A	7,632 76	
Washington street, 1008	50 00	
Washington street, 2307	930 84	
		34,360 83
Total		$288,100 00

IV.

Statement of Income.

Received from sale of old furniture	$257 00
Total	$257 00

APPENDIX III.

HIRED BUILDINGS.

I.

Rooms in the following buildings have been hired for school purposes; rents, taxes, water rates, heating, lighting and janitors' expenses paid for the same, amounting to $25,580.27, during the year, from February 1, 1906, to February 1, 1907:

For	Location.	Remarks.
Bennett District, Kindergarten,	Brooks street, Faneuil Church	Rent per annum, $600, including heat and janitor.
Blackinton District	Bennington street, for Portable Building, 51	Rent per annum, $180, to Sept. 1, 1906; $240 from Sept. 1, 1906, for use of land only.
Comins District, Cooking School,	Tremont street, 1518	Rent per annum, $600, including heat and janitor, vacated Mar. 1, 1906.
Comins District, Kindergarten and Primary Classes	Germania Hall, Columbus avenue, 1448	Rent per annum, $1,800, including heat and janitor.
Dorchester High School	Centre street, Dorchester, for Portable Buildings, 10, 31, and 32	Rent per annum, $200, for use of land only.
Emerson District, Primary Class	Saratoga street, 399	Rent per annum, $300, not including heat or janitor.
Evening Drawing School	Columbus avenue, 147	Rent per annum, $1,300, not including heat or janitor; vacated Nov. 1, 1906.
Evening Drawing School	Masonic Hall, Washington street, 2307, Roxbury	Rent per annum, $1,000; city pays water rates, heat and janitor; vacated May 1, 1906.
Franklin District, Primary Class	Asylum Building, Washington street, 1008	Rent per annum, $600; city to furnish fuel.
Girls' Latin School	Chauncy Hall, Copley square	Rent per annum, $7,000, to July 1, 1906; $8,000, from July 1, 1906, and taxes; city pays for heat, water and janitor.

HIRED BUILDINGS. — *Continued.*

For	Location.	Remarks.
Hancock District, Kindergarten and Primary Classes..........	Parmenter street, 20........	Rent per annum, $1,900, to June 1; $1,600 from June 1, and $1,000 from Dec. 1, 1906, including heat and janitor; 1 room vacated Dec. 1, 1906.
Hancock District, Grammar Class..........................	Parmenter street, 32........	Rent per annum, $400, including heat and janitor; vacated July 1, 1906.
Longfellow District, Primary Classes......	Beech street, Phineas Bates Portable Building, 12....	Rent per annum, $125, for use of land only.
Longfellow District, Primary Class..........................	Hewlett street, 17...........	Rent per annum, $240, not including heat or janitor.
Longfellow District, Kindergarten Class..................	Unitarian Church, Roslindale.......................	Rent per annum, $600, including heat and janitor.
Manual Training School.........	Tremont street, 1508........	Rent per annum, $600, including heat and janitor; vacated Mar. 1, 1906.
Manual Training School.	Eliot street, Jamaica Plain.	Rent per annum, $300, including heat and janitor.
Oliver Wendell Holmes District, Kindergarten..................	Greenwood Hall, Dorchester	Rent per annum, $600, including heat and janitor; vacated May 1, 1906.
Roger Wolcott District, Kindergarten..........................	Walk Hill street, 727........	Rent per annum, $360, including heat and janitor; vacated Mar. 1, 1906.
Roger Wolcott District, Kindergarten and Primary Class.....	Lauriat avenue, 170, Dorchester	Rent per annum, $1,200, including heat, water and janitor.
Shurtleff District, Kindergarten and Cooking School...........	East Fourth street, 484, South Boston.............	Rent per annum, $600, not including heat, water or janitor.
Warren District, Kindergarten and Primary Class.............	Pearl street, 8, Charlestown.....................	Rent per annum, $720; city pays heat, water and janitor's services.
Wells District, Kindergarten and Grammar Classes.........	Chambers street, 38.........	Rent per annum, $480, to Oct. 8, including heat, janitor and water rates; grammar class reinstated Oct. 8, 1906; rent from Oct. 8, 1906, $1,080.
Wells District, Primary Classes,	Chambers street, 27	Rent per annum, $800, from Sept. 25, 1906; city pays one-half cost of gas and water rates. City pays janitor and heating.

HIRED BUILDINGS. — *Concluded.*

For	Location.	Remarks.
Winthrop District, Grammar Classes	Tremont street, 238	Rent per annum, $3,333.34, including heat, water and janitor's services. Vacated May 1, 1906.
Winthrop District, Grammar Classes	63, 63A Warrenton street	Rent per annum, $1,200; city pays water rates, heating and janitor.

II.

SUBDIVISION OF EXPENDITURES.

Amounts paid from appropriation for rents, taxes, water rates, heating, lighting, and janitor's services, for each hired building during the year 1906–07:

Beech street, lot, Roslindale	$125 00
Bennington street, lot	195 00
Brooks street, Brighton, Faneuil Chapel	600 00
Centre street, lot, Dorchester	200 00
Chambers street, 27, West End	200 00
Chambers street, 38, St. Andrew's Chapel	630 00
Chauncy Hall, Copley square	11,105 00
*Columbus avenue, 147	1,083 33
East Fourth street, 484, South Boston	613 00
Eliot street, Jamaica Plain, Trustee building	300 00
Germania Hall, 1448 Columbus avenue, Roxbury,	1,800 00
*Greenwood Hall, Glenway, Dorchester	240 00
Hewlett street, 17, Roslindale	240 00
Lauriat avenue, 170, Dorchester	1,200 00
Parmenter street, 20, North End Union	1,700 00
*Parmenter street, 32	183 34
Pearl street, 8, Charlestown	733 00
Saratoga street, 399, East Boston	300 00
*Tremont street, 238	1,110 44
*Tremont street, 1508, Roxbury	100 00
*Tremont street, 1518, Roxbury	100 00
Unitarian Church, South street, Roslindale	600 00
*Walk Hill street, 727, Dorchester	60 00
Warrenton street, 63 and 63A, City Proper	1,590 82
Washington street, 1008, City Proper, in rear	50 00
*Washington street, 2307, Roxbury	521 34
	$25,580 27

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* Have been vacated during the year.

APPENDIX IV.

Table Showing Cost of Buildings, Cost per Cubic Foot, Children Accommodated, and Cost per Pupil.

NAME OF SCHOOL BUILDING.	Grade.	Building, Heating, Plumbing, and Electrical Contracts.	Total Cost of Building.	PERCENTAGE CONTRACTS BEAR TO TOTAL COST OF BUILDING.				Cubical Contents.	Cost per Cubic Foot.	PROPORTION CONTRACTS BEAR TO COST PER CUBIC FOOT.				Cubic Feet, Class-room.	Children Accommodated.	Cost per Pupil.
				Bldg.	Heat.	Plumb.	Elec.			Bldg.	Heat.	Plumb.	Elec.			
				Per Ct.	Per Ct.	Per Ct.	Per Ct.		Cents	Cents	Cents	Cents	Cents			
Marshall	P.	B., $106,516 75 H., 9,483 00 P., 5,197 00 E., 3,270 90	$124,467 65	85	8	4	3	516,624	24	20	2	1	1	37,000	700	$177 81
William E. Russell.......	G.	B., $158,189 52 H., 15,132 40 P., 9,580 29 E., 5,622 35	188,524 56	84	8	5	3	894,941	21	17	2	1	1	50,000	900	209 47
Farragut..................	P.	B., $127,262 98 H., 12,432 00 P., 6,821 45 E., 4,010 00	150,526 43	85	8	4	3	652,630	23	19	2	1	1	47,000	700	215 04
Paul Jones................	P.	B., $95,095 75 H., 10,376 00 P., 5,324 00 E., 3,574 60	114,370 35	83	9	5	3	510,386	22	18	2	1	1	36,000	700	163 39
Ellis Mendell.............	P.	B., $103,569 20 H., 9,625 04 P., 5,658 11 E., 3,414 85	122,267 20	85	8	4	3	517,035	24	20	2	1	1	43,000	600	203 78
Jefferson	G.	B., $182,261 94 H., 16,927 15 P., 6,449 90 E., 5,251 50	210,890 49	86	8	3	3	856,777	24	20	2	1	1	45,000	950	221 99

Table Showing Cost of Buildings, Cost per Cubic Foot, Children Accommodated, and Cost per Pupil. — *Continued.*

NAME OF SCHOOL BUILDING.	Grade.	Building, Heating, Plumbing, and Electrical Contracts.	Total Cost of Building.	PERCENTAGE CONTRACTS BEAR TO TOTAL COST OF BUILDING.				Cubical Contents.	Cost per Cubic Foot.	PROPORTION CONTRACTS BEAR TO COST PER CUBIC FOOT.				Cubic Feet, Class-room.	Children Accommodated.	Cost per Pupil.
				Bldg.	Heat.	Plumb.	Elec.			Bldg.	Heat.	Plumb.	Elec.			
				Per Ct.	Per Ct.	Per Ct.	Per Ct.		Cents	Cents	Cents	Cents	Cents			
Washington.............	G.	B., $263,661 16 H., 28,305 94 P., 21,417 05 E., 12,157 45	$325,541 60	82	7	7	4	1,300,792	25	20	2	2	1	43,000	1,500	$217 03
Christopher Columbus...	P.	B., $136,966 08 H., 16,244 00 P., 15,519 00 E., 4,783 00	173,512 08	79	9	9	3	727,068	23	18	2	2	1	30,000	1,200	144 59
John Boyle O'Reilly	P.	B., $95,712 50 H., 10,227 00 P., 4,040 00 E., 2,859 50	112,839 00	85	9	4	2	450,248	25	21	2	1	1	32,000	700	161 20
Oliver Hazard Perry.....	G.	B., $118,497 38 H., 17,621 50 P., 5,094 00 E., 4,932 75	146,145 63	81	12	4	3	612,351	24	19	3	1	1	44,000	700	208 78
Mather..................	G.	B., $241,098 44 H., 27,807 00 P., 11,645 50 E., 8,782 05	289,332 99	83	10	4	3	1,353,831	21	17	2	1	1	42,000	1,600	180 83
Add'n, Francis Parkman, Thomas Gardner[1]........	G.	B., $113,769 15 H., 15,994 04 P., 6,038 00 E., 4,466 38	140,267 57	81	12	4	3	735,573	19	15	2	1	1	52,000	700	200 38

Oliver Wendell Holmes..	G.	B., $159,563 85 H., 21,930 18 P., 8,037 00 E., 6,116 99	195,648 02	81	12	4	3	991,609	20	16	2	1	1	41,000	1,200	163 04
Samuel W. Mason........	P.	B., $99,527 64 H., 10,447 00 P., 4,990 00 E., 3,360 00	118,324 64	84	9	4	3	438,223	27	23	2	1	1	31,000	700	169 03
Dearborn[1]...............	G.	B., $182,104 79 H., 20,874 00 P., 8,929 50 E., 5,087 00	216,995 29	84	9	4	3	980,100	22	18	2	1	1	47,000	1,050	206 66
John Greenleaf Whittier,	P.	B., $61,053 55 H., 7,540 70 P., 3,551 00 E., 2,590 90	74,736 15	82	10	5	3	325,051	23	19	2	1	1	32,000	500	149 47
James Otis...............	P.	B., $90,867 00 H., 8,767 00 P., 4,889 00 E., 3,295 00	107,818 00	84	8	4	4	411,645	26	22	2	1	1	34,000	600	179 70
Tuckerman..............	P.	B., $61,875 79 H., 8,422 00 P., 4,226 70 E., 2,898 76	77,423 25	80	11	5	4	330,171	23	18	3	1	1	33,000	500	154 85
Wm. E. Endicott.........	P.	B., $64,745 25 H., 7,951 00 P., 3,667 91 E., 2,693 61	79,057 77	82	11	4	3	348,883	23	18	3	1	1	35,000	500	158 11
Sarah J. Baker..........	P.	B., $130,016 23 H., 18,673 00 P., 7,625 00 E., 4,880 00	161,194 23	81	11	5	3	702,384	23	18	3	1	1	29,000	1,200	134 32
Nathaniel Hawthorne....	P.	B., $54,682 82 H., 7,518 00 P., 3,100 00 E., 2,611 25	67,912 07	80	11	5	4	281,305	24	19	3	1	1	31,000	450	150 92

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[1] Cost to February 1, 1907.

Table Showing Cost of Buildings, Cost per Cubic Foot, Children Accommodated, and Cost per Pupil. — *Concluded*

NAME OF SCHOOL BUILDING.	Grade.	Building, Heating, Plumbing, and Electrical Contracts.	Total Cost of Building.	PERCENTAGE CONTRACTS BEAR TO TOTAL COST OF BUILDING.				Cubical Contents.	Cost per Cubic Foot.	PROPORTION CONTRACTS BEAR TO COST PER CUBIC FOOT.				Cubic Feet, Class-room.	Children Accommodated.	Cost per Pupil.
				Bldg.	Heat.	Plumb.	Elec.			Bldg.	Heat.	Plumb.	Elec.			
Charlestown High¹.......	H.	B., $251,256 35 H., 18,677 00 P., 13,970 00 E., 9,744 00	293,647 35	85	7	5	3	1,170,000	25	21	2	1	1	....	540	$543 74
NORMAL AND LATIN GROUP.																
Common Building¹.....																
Normal¹................	H.	B., $272,125 43 H., 25,611 80 P., 12,805 90 E., 9,604 43	320,147 56	85	8	4	3	1,416,947	23	19	2	1	1	....	350	914 70
Girls' Latin¹...........	H.	B., $252,213 80 H., 23,737 77 P., 11,868 89 E., 8,901 66	296,722 12	85	8	4	3	1,300,808	23	19	2	1	1	....	600	494 54
Patrick A. Collins¹.....	G.	B., $139,381 32 H., 13,118 24 P., 6,559 12 E., 4,919 34	163,978 02	85	8	4	3	733,446	23	19	2	1	1	43,000	850	192 92

¹ Cost to February 1, 1907.

NOTE. — Number of new buildings, 27. Total amount of contracts, elementary grades (primary and grammar), $3,361,772.99; high, $910,517.03; addition, Francis Parkman School, $36,976.99; grand total, $4,309,267.01. Total number of children accommodated: Primary, 9,050; grammar, 9,450; total, 18,500. Average cost per cubic foot, all buildings 23 cents. Average cost per cubic foot, primary, 24 cents. Average cost per cubic foot, grammar, 22 cents. Average cost per pupil, $181.72. Average cost per pupil, primary, $164.03. Average cost per pupil, grammar, $198.66.

These averages apply to the Charlestown High School, Normal School and Girls' Latin School only as to the cost per cubic foot. The Common Building is used jointly by the pupils of the Normal and Girls' Latin School, hence the cost of this building and cubical contents has been equally distributed between these two buildings.

APPENDIX V.

ARCHITECTS' SERVICES.

Every Architect employed by the Schoolhouse Commissioners of the City of Boston as the Architect for erecting a building is to perform the duties hereinafter provided.

SECTION 1. — *The Board.* — (*a.*) Is to furnish the Architect with the requirements and information for the design and construction of the building for which he is the Architect, and give the approximate cubical contents and proposed cost per cubic foot thereof;

(*b.*) Is to employ domestic engineers to confer with the Architect during the preparation of preliminary studies, and when these are accepted by the Board to advise the Architect in the details of their work, and make the necessary working drawings and specifications for, and have the direction of, the heating, ventilating, and electric work for the building, said work being hereinafter designated as the domestic engineering;

(*c.*) Is to give the grade and lines of streets and adjoining lots;

(*d.*) Is to make all borings necessary to determine the quality of the foundations, and on request of the Architect, or of any person doing work on the building, furnish him full information relating to the above, the sewer, water, gas and electric service, and to the rights, restrictions, and boundaries of the lot on which the building is to be constructed.

SECT. 2.—*The Architect.*—(*a.*) Is to consult and advise with the Board and make such preliminary studies as will acquaint the Board with the contemplated arrangement, design, construction and cubical contents of the building, and enable them to agree with the Architect upon a definite limit of cost therefor, and to accept said preliminary studies as the basis of working drawings and specifications;

(*b.*) Is to make upon the basis of said preliminary studies one complete set of working drawings in ink on tracing cloth, floor and framing plans, sections and elevations at one-eighth scale, and such detail drawings on a larger scale as are necessary to explain the specifications;

(*c.*) Is to furnish, revise and correct for the printer one complete set of specifications for everything to be furnished or done in constructing the building, except the domestic engineering;

(*d.*) Is to loan to the Board, to make blue prints therefrom, the said set of working drawings;

(*e.*) Is to restudy and if necessary redraw, without charge, any or all of said drawings and specifications, if, owing to an unwarranted departure from the approved preliminary studies or to a needlessly extravagant or elaborate interpretation of them in said drawings and specifications, the lowest bid for doing the work in accordance therewith over-runs the limit of cost agreed upon by the Architect and the Board;

(*f.*) Is, upon the signing of contract, to deliver to the Board, to remain their property, two sets of blue prints mounted on cloth taken from the said set of working drawings, a perspective drawing of the exterior of the building suitable for reproduction, and at the conclusion of the work, a complete set of working drawings on tracing cloth, either the set previously referred to or a copy therefrom, which shall be corrected to agree with and embody all changes made during construction.

(*g.*) Is to make application for a building permit to the Building Department on a form signed by the Chairman of the Board, and deliver to the Building Department two sets of such blue prints from the said set of working drawings as may be required by the Building Department (the Board furnishing specifications to the Building Department);

(*h.*) Is to have general supervision of the domestic engineering and be the Architect of all other work to be done under any written contract for the construction of the building and render the full usual Architect's services, and supervision for such other work;

(*i.*) Is, in the form prescribed by the Board, to make all estimates and allowances for payments under any contract in which he is made the Architect of the work, and such estimates for the domestic engineering are to be accompanied by certificates of said Engineers as to their accuracy;

(*j.*) Is to advise with the Board on any changes in the building contemplated by the Board, and is to order changes when required by the Board so to do;

(*k.*) Is to cause the drawings and specifications furnished by him to conform to all regulations of law and public authorities, and to be in accordance with established methods of building construction, faithfully carry out all the foregoing provisions, use all proper knowledge, skill, and care therein, and be accountable for any failure so to do.

SECT. 3.— The city, as full compensation for the services aforesaid, is to pay the Architect 2½ per cent. upon the cost of the domestic engineering, and 5 per cent. upon the cost of all other work, payments to be made as follows: 2½ per cent. upon all contracts other than those for domestic engineering is to be paid on the signing of such contracts, and thereafter 2½ per cent. upon the value of the materials and labor, as specified in each estimate for payment under the contract, is to be paid on the making of the estimate, until the full payment aforesaid is made, and if any thereof remains unpaid at the completion of the work it is then to be paid. When preliminary studies are completed, the value of the Architect's services to date shall be reckoned one-fifth of the estimated total commission; when working drawings and specifications are ready for contract, the value of his services to date shall be reckoned as three-fifths of said commission. If the Board discontinue the services of the Architect at any intermediate stage the value of his services shall be reckoned proportionately.

SECT. 4. — When for any reason other than those stated in section 2, paragraph *e*, above, the Board shall set aside the whole or any part of an Architect's studies, drawings, and specifications while retaining him to prepare corresponding new studies, drawings, and specifications, for the same school building, the city shall pay the Architect for the work thus set aside a sum not exceeding three times the actual cost of draughting, and the new work shall be paid for on a commission basis as stated in section 3, above.

SECT. 5.— In the above agreement the term "building" is used to define not only the structure itself, but all work in connection with it committed to the Architect by the order of the Board, as fencing, grading, roads, walks, planting, decorative painting, and sculptural decoration.

APPENDIX VI.

REPORT ON EQUIPMENT FOR TEACHING CHEMISTRY IN BOSTON HIGH SCHOOLS.

CHEMICAL LABORATORY OF HARVARD COLLEGE,
CAMBRIDGE, MASS., U.S.A., April 24, 1906.

To the School House Commissioners, *Boston :*

In your letters to me of November 6 and November 8, 1905, you ask :

First. — My criticism " on a specific plan and specifications, for example, for the Charlestown High School Chemical Laboratory."

Second. — " A written opinion from you as to what is the proper equipment to teach such elementary chemistry as is given in the high school courses in the City of Boston."

Third. — " What is the proper equipment to prepare pupils to become teachers of chemistry in the Boston schools."

Pursuant to your request and in order to obtain data which should enable me to more intelligently comply with it, I planned to inspect most, if not all, of the chemical laboratories of the Boston schools. I had visited the English High School, Mechanic Arts High, West Roxbury High, Roxbury High and Dorchester High, meeting with cordiality on the part of principals and teachers, and was preparing to visit other schools, when the change in the Board of School Commissioners made it seem uncertain that the investigation would be approved by the new Board. I therefore laid the matter aside until, on February 3, 1906, I received a renewed request from you to take up the matter.

Unfortunately, since last November, when I had some time for such work at my disposal, I have become engaged with other matters which will leave me no opportunity for further investigation on this subject for the rest of this school year. I have therefore decided to make a report to you which may be regarded as tentative, if you wish, but which, on the other hand, since the five schools visited by me are fairly representative, may be sufficiently comprehensive to answer your questions. I cannot but feel, however, that my opinion, based on my observation of other schools, my own experience in teaching, and my occasional conversations with teachers would probably not be greatly changed by increasing the amount of data which might be obtained by further visits. This report is accompanied by tables * containing data collected from the five schools above mentioned. These tables will contain occasional errors in observation, but they are accurate enough for reference, if desired.

(1.) *Percentage under Instruction in Chemistry.* — The percentage of pupils under instruction in chemistry is probably not less than 7 per cent. or more than 13 per cent. of the total number in the school, and the instruction seems to be given mainly in the third year, occasionally or additionally in the second or fourth.

(2.) *Courses.* — The chief instruction given is in elementary chemistry, including the fundamental principles of the science and some descriptive chemistry, carried on chiefly by laboratory work, recitations and occasional lectures. There is little systematic qualitative analysis, though the course in elementary chemistry may include simple qualitative tests and separations. Except for the introduction of quantitative principles into elementary chemistry, there is no general instruction in quantitative analysis, nor is any other branch of chemistry specially taken up, except in one instance where mineralogy is included in the course.

(3.) *Object.* — The instruction in chemistry is mainly a part of the general high school education, but a fair proportion of the pupils in some schools are fitted to pass the entrance examinations for college or technical school. A limited number of these are qualified to do advanced work in the latter.

(4.) *Training.* — I have not found that any pupils whose chemical training has been solely in these schools have obtained places as teachers, nor is it the opinion of the majority of the present teachers that this is possible. Further, it seems to be rare that even a subordinate position in technical chemistry is sought for or obtained by pupils who have had their sole chemical education in these schools.

(5.) *Methods.* — The periods per week devoted to instruction in chemistry are four to five in number throughout the year, of which two are generally for laboratory work. The teacher is usually not of chemistry alone, but generally has additional work in other branches. The sections average 25 to 30 in number, which is a large number for one teacher either in laboratory or recitation. Occasionally an assistant is provided, having also other duties. Outside of the required hours the laboratory is rarely used by pupils except for the purpose of making up back work.

(6.) *Opinions as to Instruction.* — The opinions of the teachers as to what should be taught in a high school differ considerably as to scope and time. Aside from the purely elementary chemistry, some favor a large amount of descriptive work, some a large amount of qualitative analysis, and others believe that the instruction should include quantitative analysis and organic chemistry. Nearly all consider that at least two years should be devoted to the subject, and those who wish a broader scope consider three years necessary.

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* Copy of tables may be obtained by applying at the office of Schoolhouse Department.

(7.) *Amount of Probable Instruction.* — The question of what constitutes a proper equipment for teachers of elementary chemistry in the Boston High Schools must, from the above considerations and those to follow, be considered on an entirely different basis from that of a college or technical school. As to the amount and duration of instruction, it is my opinion that where practicable two years of five periods per week should be given to the subject, which should include :

Elementary General Chemistry, embracing the fundamental conceptions and illustrated by laboratory work which shall include as many quantitative experiments as possible.

Descriptive Chemistry, which shall give to the pupil such facts in regard to chemical substances and processes of manufacture as will be of general educational value.

Qualitative Analysis, as far as is necessary in connection with elementary general and descriptive chemistry, but not a specialized treatment.

(8.) *Considerations to Follow.* — With this amount and duration in view, it becomes necessary to consider :

A. The rooms in general required.
B. The laboratory
    1. Fixtures.
    2. Ventilation and plumbing.
C. The lecture and recitation-room.
D. The administrative facilities.

A. THE ROOMS IN GENERAL REQUIRED.

(9.) *Laboratory.* — The laboratory should be separate from the lecture-room. It may be used as a recitation-room in case the repetition of experiments by the teacher or demonstration of experiments by teacher or pupil be included as a part of the recitation plan. In this case, however, a portion of the laboratory must be set aside for arm desks and demonstration table, hence it is in general better to hold the recitations in the lecture-room.

(10.) *Lecture and Recitation Room.* — The lecture-room should be separate from the laboratory, but easy of access. A lecture-room for chemistry alone is not essential, though preferable, but the lecture-room should not be used for subjects not allied to chemistry. A combined lecture-room for physics and chemistry is admissible, and has many advantages, but lectures on chemistry should not be given in a general auditorium. The lecture-room may be used for recitations also, but recitations should not be held in a room unprovided with facilities for demonstration of experiments.

(11.) *Rooms for Administration.* — For administrative purposes mainly, there should be three rooms — a storeroom for dry chemicals and apparatus, a room for storage of liquid chemicals and for preparation of re-agents, which may also be used as a laboratory for the teacher, and an office which may be used as an administrative room and as a balance room.

B. THE LABORATORY. 1. FIXTURES.

(12.) *Adaptation to Instruction Given.* — The nature and scope of the instruction in chemistry in a high school and the disproportion of pupils to teachers make the question of laboratory and its appointments different in many respects from that of an advanced school. The high school does not educate chemists; it does not, except in individual cases, deal with pupils who are mature enough to understand the relation of chemistry to other subjects; the system does not now permit of much individual attention or instruction from teacher to pupil, nor can it ordinarily train pupils to reason. The problem, therefore, as the system is now constituted, for which there is no practical substitute, is to provide, as conveniently as possible for teacher and pupil, a method of communicating to the average pupil a knowledge of such chemical facts and principles as are necessary in the scheme of education which the city furnishes. For this purpose simplicity in construction and furnishing should be sought, but, on the other hand, nothing should be omitted which would facilitate the work of the teacher.

(13.) *Capacity.* — The laboratory should be placed as near the top of the building as possible. It need not be built to accommodate more than 40 to 50 pupils at one time, but each desk should be of such a size that three sections of 40 to 50 may find accommodation for apparatus. It should be lighted on two sides.

(14.) *Materials.* — The floor should be preferably of concrete, but may be of hard wood in narrow strips, filled in by asphalt. It should slope very slightly between desks, the desk interspaces again trending to a common corner which may be drained. The walls should be of face brick, and the ceiling of plaster covered with a water resisting surface containing no lead. All woodwork in the laboratory should have a natural finish except the tops of the desks.

(15.) *Working Desks.* — The working desks should run at right angles to the greater length of the room, in sections placed back to back between windows; sections to be movable when the top is removed. The distance between double sections should be about five feet, and the same distance at least should be between the ends of the sections and the hood, which should be opposite the longer line of windows and at right angles to the direction of the desk sections. The other ends of the sections should come sufficiently near the building wall to allow for the common drain (paragraph 33) running under the windows at right angles to the sections.

(16.) *Sections.* — Each section may be from 21 feet to 24 feet 6 inches long, and about 2 feet in width, measured on the desk top, and from 3 feet to 3 feet 2 inches in height, including the desk top. The material should be of ash or any durable wood, finished natural. The top should be made of narrow white pine strips, not less' than 1½-inch stock, securely fastened together, and treated with aniline black and waterproof lead finish. The top should project not more than 1 inch over the body of the section.

(17.) *Drawers, Closets.* — The individual desk should be provided with three lockers and three sets of two drawers each, each set of drawers to be fastened by a bar operated from the locker, the locker in turn to be fastened by a combination lock.

(18.) *Sink.* — Each double section of desks should be provided with a sink of soapstone placed between the sections and flush with the section top, which should slope slightly to the sink. The sink should be not less than 8 inches wide and should begin within 1 foot of the end toward the hood, having here a depth of 6 inches, running nearly to the other end and having here a depth of 8 inches.

(19.) *Working Space.* — The working space thus secured to the single pupil would be 3 feet 6 inches by 1 foot 8 inches.

(20.) *Shelves.* — Each double section of desks should be provided with a shelf for re-agents running the length of the desk, 10 inches to 12 inches above the desk and supported by metal standards at suitable intervals. This shelf should be of white wood 1¼ inches thick and 9 inches wide, finished natural and covered by glass plates ¼ inch in thickness, 9 inches wide and in suitable lengths, clamped to the wooden shelf by as few clamps as possible.

(21.) *Other Space.* — At the free end of each section may be placed a wooden shelf, 1 inch to 1½ inches in thickness, 3 feet to 4 feet long and not over 1 foot 3 inches wide, at a height of 2 feet 8 inches to 2 feet 10 inches, for the purpose of holding blast lamps, re-agent jars, or for general utility. The finish of the top should be in aniline black. The floor space under the second row of windows may be taken up with a line of extra desks built on the same principle as the sections and furnished like them, but without necessarily a drain. These desks could be used for an emergency or for general utility. The wall space above the extra desks and all wall spaces not otherwise provided for may be used for wall shelves or cabinets.

(22.) *Blackboards.* — The wall space at the end of the room opposite the second set of windows and parallel to the desk sections should be provided with standard fixed slate blackboards, and there should be sliding slate blackboards of convenient size above the hood.

(23.) *Slop Collections.* — No provision is made in the plan of the above desks for a compartment for slop and waste container. All liquids likely to be used may be thrown into the desk sink, except when this is filled with water as a pneumatic trough, and without injury to the mains, since there is usually a sufficient dilution before reaching the corrodible pipes. Pupils should be taught to dilute strong acids before disposing of them. Solids and dry waste ought always to be disposed of separately from liquids and should be thrown into earthen jars.

(24.) *Hood.* — Aside from the ordinary ventilation of the room, the removal of heavy, unpleasant or noxious gases should be carefully provided for. Experiments producing such gases are not performed in the open room, but in the closets provided with separate draught known as the hood. The function of the hood, however, in a course for which we are providing, should be mainly limited to the removal of obnoxious gases and need not be built with reference to careful quantitative methods. Much, therefore, of the elaborate hood construction with which I have met may be simplified.

(25.) *Position and Dimensions of Hood.* — The hood should run at right angles to the desk sections and along the wall opposite the free ends of these sections. The height of the floor of the hood above the floor of the room should be about 2 feet 10 inches, and the minimum height from floor to top 5 feet. The floor space provided in the hood should be about one-tenth of the space given to the working desks. The width should not be less than 2 feet inside. This would give a hood from 15 to 20 feet in length. It is well to divide the space into compartments, but not into more than 3 or 4, each closed by a sliding window about 4 feet in width or two sliding windows each 2 feet in width. These windows will close an opening of say 3 feet in height, and when raised will project about 1 foot above the top of the hood.

(26.) *Material of Hood.* — The materials of the hood are to be considered more with regard to protection against fire than for absolute cleanliness. And yet, as the hood is with rare exceptions used only during a laboratory period and is under the control of a teacher at all times, the danger from fire is very slight. It should be built against a brick wall. The material may be entirely of wood, except the floor, which should be of slate. Outside and inside the wood should be finished natural.

(27.) *Ventilation of Hood.* — More important than the question of materials is that of ventilation. Each compartment should be ventilated by at least a 9-inch hole at the top. Into this should set tightly an elbow or T of drain pipe. Connecting the elbows and Ts a drain pipe of the same diameter should run along the top of the hood, outside and thus easy of access from the room, connecting the compartments of the hood with the main flue. At a convenient point in this flue should be set a fan operated by a suitable motor. I am quite aware that this construction is radically different from that which now obtains, but I feel certain that it will answer the purposes to which the hood is put, will not be dangerous on account of fire, will be sufficiently clean, and with reasonable care can be kept in a presentable condition.

(2.) VENTILATION AND PLUMBING.

(28.) *Sink.* — The space against the wall not occupied by the hood may be occupied by a general sink. (See paragraph 34.)

(29.) *Ventilation.* — I assume that in a modern school the ventilation will be on the present system of upper and lower ducts, and that the room will be provided with thermostats. Attention should be paid to the fact that during working hours the amount of carbon dioxide gas from the gas burners, not to speak of other vapors which are absent in a recitation room, is excessive.

(30.) *Gas on Desks.* — The lead from the gas main should come up at the free end of the centre of the double desk sections, and branch into two leads along the back of each section. There should be take-offs between each working desk space in the form of a pillar with two ¼-inch cocks, and at each end desk a single cock, thus allowing each pupil two gas connections.

(31.) *Water on Desks.* — The lead from the water main should also come up at the free end of the centre of the double desk section, and should be of such a size as to permit, by means of a valve used only for that purpose, of rapidly filling the section sink when that is to be used as a pneumatic trough. From this lead a lead of ordinary size should extend along the length of the section on the under side of the shelf. On this there should be a take-off at the free end of the section, to which may be attached a "Richards" or some other form of combined blast and suction pump. There should be at the junction of each four working desk spaces a take-off carrying two valves with hose-bibb delivery, ¾ inch, the two valves or cocks facing on opposite sides. To these bibbs may be attached a suction pump if desired. I am unable to see the need of hot water and hence of combination taps on the section desks.

(32.) *Sink.* — The section desk sink has been mentioned in paragaph 18. This is provided at its deeper end with an open drain and mercury arrester, into which should be set a movable concave netting of wide mesh to arrest larger solid matter.

(33.) *Drain.* — The main desk drain should run at right angles to the sections, along and under the windows and between the windows and the sections. It should start from the centre of the section nearest the corner between windows, and should slope toward the next corner of the room. It should be made in the form of a heavy wooden trough, in sections dovetailed, from 6 inches to 8 inches inside diameter, and equally deep, covered with an asphalt paint or filling. It may be supported on brackets against the wall and left open, or covered and provided with a movable top, to allow free access for purposes of cleaning. Into this drain will dip the lead pipes coming from the section sinks. Solid matter escaping the coarse netting will be arrested by the drain, and for further protection the drain should empty into a shallow concrete basin in the corner of the room, which may be drained into the common drain. Over this should be placed a fine netting. To this corner should converge the slightly concave channels mentioned in paragraph 14. With such a protection, I see no use for expensive lead-lined drain pipes. If thought best, a faucet could deliver into the drain at its lowest point, thus insuring still more effective dilution.

(34.) *General Sink.* — As mentioned in paragraph 28, a general sink should be placed next to the hood, say at its right. This may be of soapstone, 4 feet to 5 feet long, 10 inches to 12 inches deep and 18 inches wide. It may be provided with hot and cold water. It would be for general purposes, and no acids should enter it except under control.

(35.) *Gas in Hood.* — There should be two ¼-inch gas nipples at each side of each hood compartment, projecting slightly beyond the hood casing at the front, and placed as near the hood floor as possible, either side by side or one above the other as the casing permits. The cocks of these nipples should be outside the hood, and the lead to which they are attached may be under the hood floor.

(36.) *Drainage of Hood.* — The slate floor of each hood compartment should have a beveled border about ¼ inch high, and the floor should deepen slightly in the centre. At this point should be a hole 1 inch in diameter, into which is fitted a short drain pipe of lead, closed by a perforated plug, preferably of fire clay. The drain pipes should in turn be connected with a sloping drain pipe, open or closed, running toward and delivering into the general sink. This system of drainage provides for the cleaning of the hood floor, and carries off liquids in the accidental breakage of containers.

(37.) *Electricity.* — Though not frequently used, a current of electricity should be available on the section desks. The E. M. F. need not exceed 10 volts, which may be supplied from the source common to the physical and chemical side. Suitable plugs should be provided between each working space, placed under the desk top on the frame.

(38.) *Gas on Wall Desk.* — This desk (paragraph 21) should be fitted with single gas taps at intervals of 2 feet.

C. THE LECTURE AND RECITATION ROOM.

(39.) *Capacity.* — I shall assume (paragraph 10) that the lecture-room is to be used in common with physics alone, and that the recitations are to be held in the lecture-room. The capacity will depend on how necessary it is to have present at one time the entire number of pupils taking physics or chemistry, but it seems to me that the room should contain seats for 100. These seats should be in tiers and fitted with a movable arm.

(40.) *Light.* — It is not usually practicable to have an overhead lighting, but this is generally from the sides or front.

There is a disadvantage in a front light in that it is trying to the lecturer, but if the front light is constructionally unavoidable, it may be tempered by curtains. In addition to the regular curtains provision should be made for easily and quickly darkening the room. The electric lighting should be at the top and sides.

(41.) *Lecture Table.* — The lecture table should not be less than 12 feet long, not more than 3 feet nor less than 30 inches wide, with a height of 32 inches. It should be placed 4 feet distant from the wall. The material may be the same as that of the room, but the top should be made and finished like that of the laboratory desks.

(42.) *Gas.* — The gas taps need not exceed six in number, either single ¼-inch taps at intervals of 2 feet or the same grouped in pillars of 2 cocks at intervals of 4 feet. The taps should be at the front of the desk.

(43.) *Trough.* — The trough should be at the right hand end of the desk, constructed of soapstone, in two depths. The length should not exceed 30 inches, the width 20 inches. The minor depth should be from 4 inches to 6 inches, the major 16 inches to 18 inches. The length of the minor depth should not exceed 60 per cent. of the total length. The trough should be depressed in the table and provided with a flush cover.

(44.) *Water.* — The lead from the water main should be of such a size as to permit, by means of a valve used only for that purpose, of filling the trough rapidly from the bottom. From this lead should come, at the right hand end of the trough, two faucets or goosenecks with ¾-inch hose bibbs, to one of which may be attached a "Richards" or some other form of combined blast and suction pump. In addition there should be at the front left corner of the trough a ¼-inch water tap, controlled by a valve, to supply cooling water for purposes of distillation.

(45.) *Drain.* — The trough should have a screened drain with mercury trap, and also an overflow. For the last the ordinary form of standing pipe will answer. As the disposition of the acids and the waste is here entirely under the control of the teacher, I see no reason for lead-lined drain pipes from the trough.

(46.) *Disposal of Fumes.* — While the majority of experiments performed on the lecture table are not productive of injurious or disagreeable gases, yet the formation of such gases is sufficiently common to necessitate provision for their removal. There should be for this purpose a space at the left end of the desk, provided with a register and flue of at least 10 inches in diameter, which shall afford the means of a down draught. The flue should be carried under the floor to the nearest wall flue, and the draught actuated by a motor if not constructionally sufficient.

(47.) *Blackboard.* — Sliding blackboards of slate at the rear of the desk should be provided. The number and size of these will depend on the joint needs of chemistry and physics, but not less than fifty square feet of blackboard area will answer for lecture purposes in chemistry.

(48.) *Fittings.* — It will probably be found most convenient for the joint purposes of chemistry and physics to have the drawers and closets for the lesser lecture apparatus and chemicals in the body of the table, and the number and arrangement of these is a matter of individual preference. The wall on either side or under the blackboard should be provided with shelves for re-agent bottles, under glass; and the side walls of the room, in default of a special room for the purpose, should be amply provided with cabinets for the larger pieces of permanent lecture apparatus.

(49.) *Lantern.* — The joint need of physics and chemistry will decide upon the form of lantern, its arrangement and position and also the position of screen.

(50.) *Electricity.* — As the need of electricity in chemical lectures is slight compared to that in physics, it is safe to assume that whatever provision is made for the latter will answer for the former.

D. ADMINISTRATIVE FACILITIES.

(51.) *Apparatus.* — The greater part of the apparatus used for experiments is provided once for all at the beginning of the year, should be ready in the desks, and these therefore serve as an important means of storage. In addition to this apparatus it will be necessary to issue some special forms or replace broken pieces. There should be therefore an ample storage space for extra and reserve apparatus.

(52.) *Stock Chemicals.* — The apparatus storeroom may serve as a room for storage of original packages of stock chemicals, from which the dry re-agent bottles in the laboratory may be filled and from which the necessary liquid re-agents may be prepared in the preparation room. The apparatus and chemicals should be kept mainly in dust-proof cabinets with glass doors, partly in drawers.

(53.) *Preparation Room.* — This room should adjoin the above. While primarily for the storage of liquid chemicals in bulk, for the preparation of liquid re-agents from these and the storage of the supply bottles from which the laboratory re-agent bottles are filled, the room should also be fitted as a private laboratory for the teacher, so that it may be possible for him to conduct ordinary investigations, should he have the time and desire, or to allow him to encourage the occasional pupils who manifest special ability by superintending advanced work of the latter in this room.

(54.) *General Fittings of Preparation Room.*— No detailed recommendation for this room is necessary under the circumstances. It should in general contain a wide centre table with gas in the centre. Along two sides should be working desks, with drawers and closets, provided with gas, water, sink, and reasonable conveniences in the way of blast, suction, steam and electricity. Along the desks should be shelves for the storage of liquid chemicals in bulk, supply bottles and smaller re-agent bottles. An adequate hood should be provided, more carefully constructed with reference to quantitative work than that of the laboratory. The draught should be upward if possible, but if this is constructionally difficult, a down draught may be substituted.

(55.) *Office and Balance Room.* — Adjoining the store-room and preparation room should be a small office containing desk, book shelves, table, and a good grade balance for quantitative work.

(56.) *Help.* — In case the teacher is without an assistant, or the latter is occupied with too many other subjects, provision should be made for the employment of one or more of the pupils for the purpose of making up re-agents and filling the laboratory bottles; also for the issuing of apparatus and clerical work in connection with the same.

(57.) *Encouragement of Teacher.* — I am strongly of the opinion that the teacher should not only be encouraged to do as much research work as he can, but that the performance of such work should be regarded as a recommendation of the teacher for holding his position. Under the present system the often inadequate facilities for private work, the necessity of additional teaching, and the multiplicity of administrative duties without assistance combine to discourage the teacher for anything but routine work. It is certain that a teacher who is doing some original work in his subject, however small, is advancing the quality of instruction.

SPECIAL PROVISIONS.

(58.) *Hydrogen Sulphide.* — Provision should be made in one or more of the hood compartments for the rapid and constant generation of hydrogen sulphide when desired. A small form of "Parson's" generator will answer this purpose.

(59.) *Distilled Water.* — The simplest method of supplying distilled water would be one of the many gas stills which are on the market, which could be set up in a comparatively small wall space, near the general sink, into which it may drain.

(60.) *Evaporation.* — I am unable to see the necessity for an expensive outfit of special evaporation apparatus in the laboratory. For the purposes of the course a number of constant level water baths could be issued when required and set up on the working desks.

(61.) *Drying Closets.* — Similarly, a number of small drying closets (air baths) could be issued when required and set up on the working desks.

Respectfully,

CHARLES R. SANGER,
Director Laboratory of Harvard College.

APPENDIX VII.

REPORT ON ARTIFICIAL LIGHTING.

The purpose of this report is to explain what has been done in the matter of improving and standardizing the lighting of class and recitation rooms.

In the first place it should be stated that the Board has for some time been of the opinion that a school-room should be treated differently in the matter of illumination than has heretofore been the practice in rooms intended for public or commercial uses.

The lights should be installed in such a manner as to make it impossible for the eye to receive the direct rays of the illuminant; there should be an even diffusion of light, and strong contrasts of light and shadow should be avoided as much as possible.

The correctness of these principles is now recognized by the leading oculists and illuminating engineers throughout the world, and much attention is now being given to details of illumination heretofore neglected.

The earlier experiments of the Board resulted in the adoption of the indirect cluster shown in Fig. 1. This fixture consists of an under shade of opal glass, 18 inches in diameter by 6 inches in depth. Inside this shade are 4 incandescent lamps, set in porcelain sockets, at an angle of about 30 degrees from the horizontal. A cover of clear plate glass, resting in a spun metal ring, attached to the outer edge of the opal shade serves to exclude dust from the lamps and the inside of the opal under shade. Ventilation is provided by several holes in a small canopy surrounding the stem of the fixture near the glass cover.

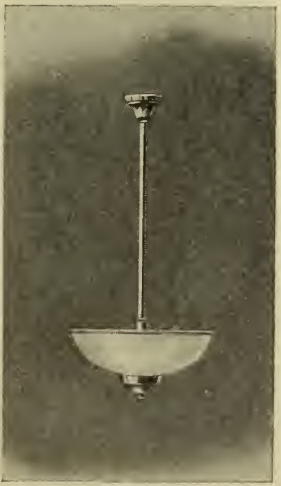


FIG. 1.

This fixture is designed to project a greater part of the light against the ceiling and side walls, from whence it is reflected toward the floor in the form of diffused light, the direct light from the opal under shade being of some assistance to the illumination, yet not of sufficient intensity to be disagreeable to the eye.

Six of these fixtures, each equipped with lamps of 48 aggregate candle power, have been found capable of giving a standard class-room a nicely diffused illumination, ample in quantity and very agreeable to the eyes.

While it has been proved that this fixture is capable of excellent results under proper conditions, considerable difficulty has been experienced in keeping the fixtures, ceilings and side walls in condition to get the best results. In most cases of complaint it has been found that the cover glasses have not been kept free of dust. The cleaning of these glasses was in turn found to be a much more serious matter than at first anticipated, from the fact that the glasses seldom fit closely into the supporting rings, consequently the dust works into the under shade whenever the glass is cleaned. This necessitates cleaning out the under shade with a damp cloth, an awkward operation, requiring considerable time. Having this feature in mind, the janitors are naturally reluctant to use the duster and the illumination of the rooms suffer accordingly. While it may be possible to have this fixture made dust tight, it is probable that the care of the fixtures will always make its efficiency doubtful. With this in view the Board has recently conducted a series of experiments at the East Boston High School, with several of the most modern types of illuminants, notably arc lamps, Cooper-Hewett Mercury Vapor, Gem High Economy and Nernst lamps, Welsbach gas mantle, and the standard type of incandescent clusters, both open and enclosed. As the Gem lamp seems most likely to give the desired results, the Board has arranged for further investigation of it both on the principle of indirect light, as in Fig. 1, and of direct light widely distributed and diffused by proper shades.

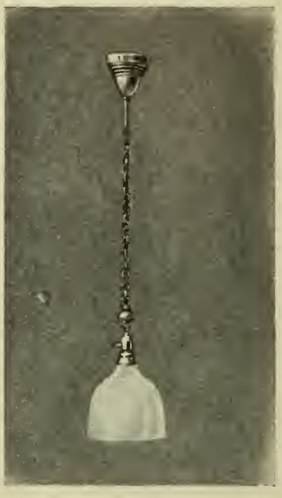


FIG. 2.

Fig. 2 shows one of these fixtures, the essential features of which are the high economy, metalized filament lamp and the prismatic glass reflecting and diffusing shade. Unlike the indirect clusters previously described, the chief object of which was so to distribute and diffuse the light as to minimize the amount of light from any one direction, and thus avoid shadow, this fixture is more distinctly direct light. The screening of the light is accomplished by the deep shade and the wide angle of the reflecting shade, and will, it is hoped, neutralize the direction on the plane of the desks and so avoid sharp shadows. The same lamp could be so arranged with shades and reflectors as to throw the bulk of the light on ceiling and thus give the advantages of the even distribution of light obtained with the fixture shown in Fig. 1.

It must be borne in mind that whereas with daylight the whole room is illuminated from one source and all is left-hand light, so that the shadows are of no disadvantage, the artificial light is from many directions and consequently its even diffusion is of prime importance. This fixture (Fig. 2) has also the advantage of being much less expensive both in initial cost and cost of maintenance, the energy required to light a standard class-room with these fixtures being 600 watts, as compared with 900 watts for the indirect clusters. Further developments in the form of shade are promised by the manufacturers, and it is expected that a practical demonstration of the fixture will be made in the near future.

The attention of the Board has also been directed to a demonstration of lighting by means of Welsbach gas mantles at the East Boston High School, and the exhibit has been carefully investigated. The quality of the light was found to be good, fairly well diffused and ample in quantity, but the Board is of the opinion that the odor, which was quite noticeable, together with the inevitable consumption of oxygen from the air in the room, makes the use of mantles undesirable. Considerable trouble has also been experienced in other schools from the breaking of mantles, due to vibration of the floors during the movement of classes.

As the principal argument against the use of electric light is in the matter of expense, it may be well to note that great progress is being made toward increasing the efficiency of the incandescent lamp, the present state of the art indicating that an efficiency of one watt per candle power will soon be reached. The efficiency of the best standard lamps of the present day is 3.1 watts per candle power, which represents a saving of about two-thirds of the present expense for lighting, and puts the incandescent lamp on a nearly equal basis with gas.

In view of these facts the Board deems it advisable to consider the electric light the standard method of illumination.

Respectfully,

BENJAMIN B. HATCH,
Department Electrical Engineer.

APPENDIX VIII.

REPORT ON HEATING AND VENTILATING.

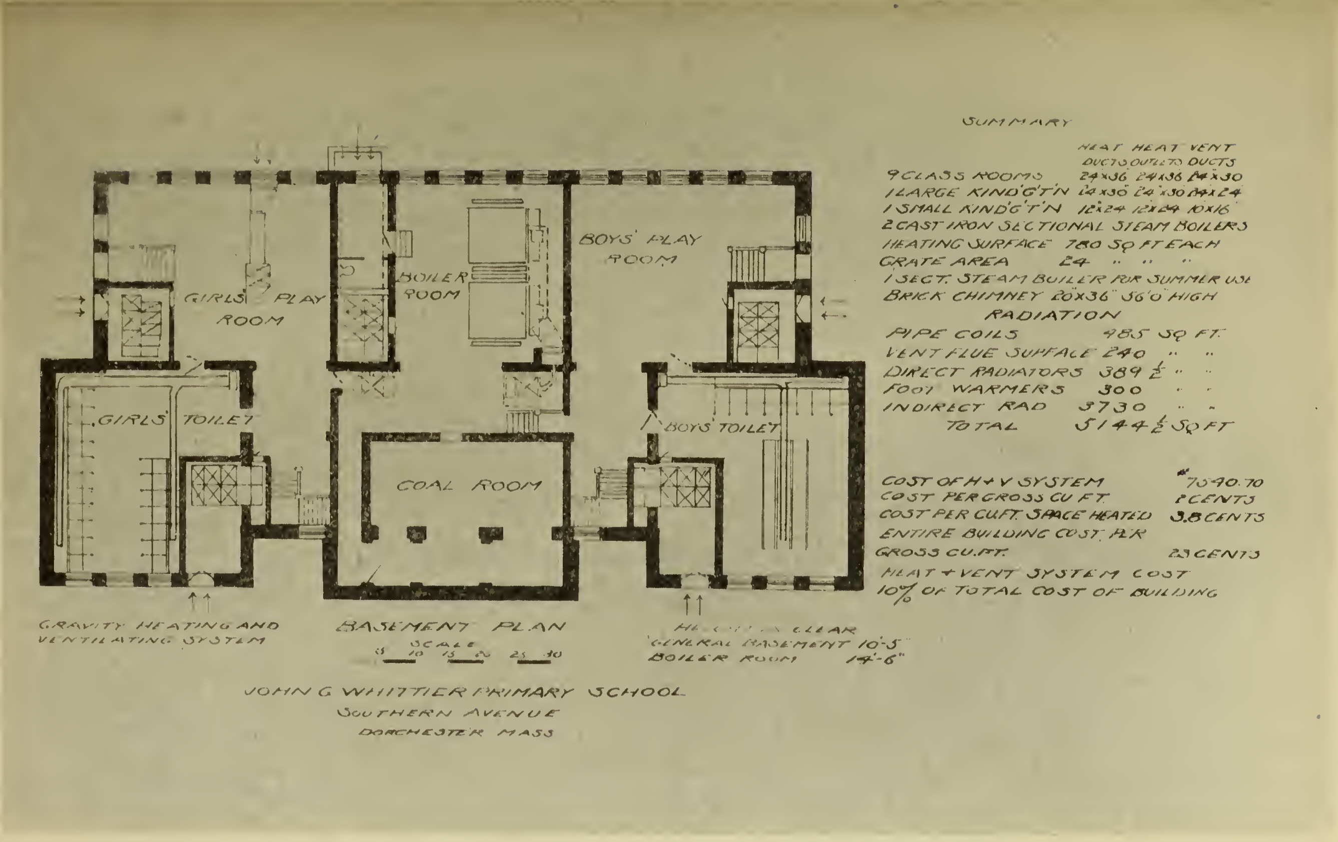
Owing to various causes the Board has been unable this year to continue the experiments, referred to in the last annual report, on the moistening of the air. Now that it has its own department of domestic engineering, these experiments will again be taken up.

In the new work an attempt will be made to put into actual practice one of the methods that has been found most practicable.

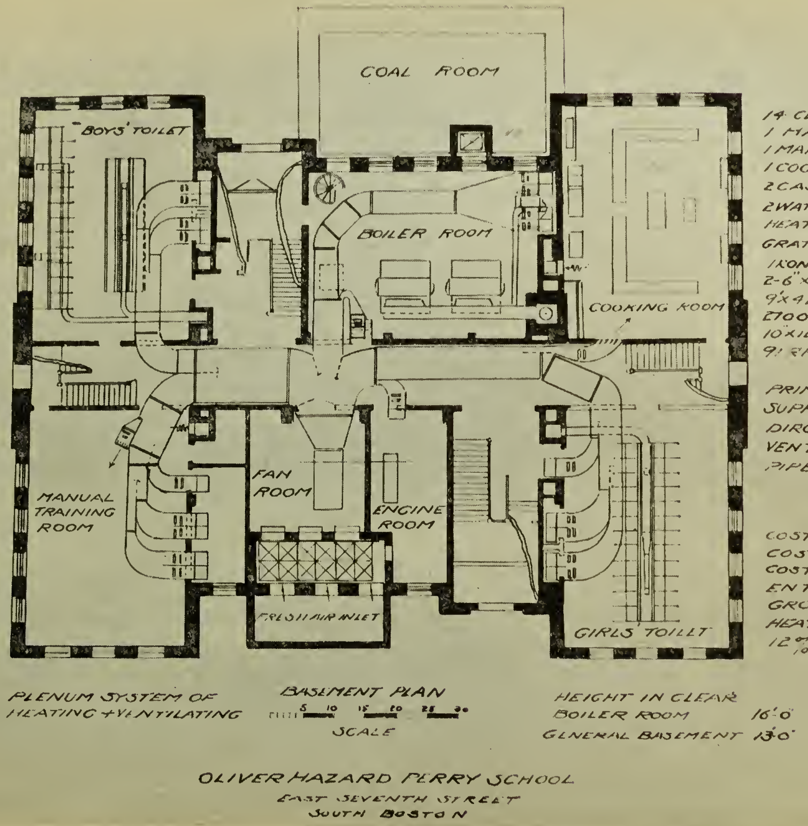
The Board has continued its practice of using both the gravity system and the plenum system for its schools, and proposes to conduct a series of tests, some of which are now under way, to show just how far the objects aimed at have been attained in the buildings that have been finished. There has been considerable complaint of the plenum systems on the score of noticeable draughts, and this has been remarked upon both when the dampers were controlled automatically and when they were controlled by hand. Also, in both plenum and gravity systems, there has been complaint of a marked difference in temperature between different parts of the room. As a result of examination and tests, the Board may decide to follow the New York plan and introduce a certain amount of direct heat into the class-rooms on the window side, but depending still for the ventilation and the greater portion of the heated air on the primary coils.

Figure 1, the John Greenleaf Whittier, is a typical example of a small primary building with a gravity system, the heating being in this case about 10 per cent. of the total cost of the building.

Figure 2 is the Oliver Hazard Perry, a fourteen-room grammar building with an assembly hall, a typical example of a fan system, a cost of 12 per cent. of the total cost of the building.


SUMMARY
HEAT DUCTS HEAT OUTLETS VENT DUCTS
9 CLASS ROOMS 24x36 24x36 24x30
1 LARGE KIND'G'T'N 24x30 24x30 24x24
1 SMALL KIND'G'T'N 12x24 12x24 10x16
2 CAST IRON SECTIONAL STEAM BOILERS
HEATING SURFACE 780 SQ FT EACH
GRATE AREA 24 " " "
1 SECT. STEAM BOILER FOR SUMMER USE
BRICK CHIMNEY 20"x36" 56'0" HIGH
RADIATION
PIPE COILS 485 SQ FT.
VENT FLUE SURFACE 240 " "
DIRECT RADIATORS 389½ " "
FOOT WARMERS 300 " "
INDIRECT RAD 3730 " "
TOTAL 5144½ SQ FT
COST OF H+V SYSTEM $7540.70
COST PER GROSS CU FT. 2 CENTS
COST PER CU.FT. SPACE HEATED 3.8 CENTS
ENTIRE BUILDING COST PER GROSS CU.FT. 23 CENTS
HEAT + VENT SYSTEM COST 10% OF TOTAL COST OF BUILDING
GIRLS' PLAY ROOM
BOILER ROOM
BOYS' PLAY ROOM
GIRLS' TOILET
COAL ROOM
BOYS' TOILET
GRAVITY HEATING AND VENTILATING SYSTEM
BASEMENT PLAN
SCALE
5 10 15 20 25 30
HEIGHTS IN CLEAR
GENERAL BASEMENT 10'-5"
BOILER ROOM 14'-6"
JOHN G WHITTIER PRIMARY SCHOOL
SOUTHERN AVENUE
DORCHESTER MASS

JOHN GREENLEAF WHITTIER SCHOOLHOUSE,
Dorchester, Boston, Mass.
(Gravity System Heating and Ventilation.) FRENCH & HUBBARD, Engineers.



SUMMARY

	HEAT DUCTS	HEAT OUTLETS	VENT DUCTS
14 CLASS ROOMS	22"x28"	28"x30"	24"x30
1 HALL	24"x36"	30x36	24x30
1 MANUAL TR'G ROOM		28x30	24x30
1 COOKING ROOM		28x30"	24x30"

2 CAST IRON SECT. BOILERS
2 WATER TUBE BOILERS 100 H.P. EACH
HEATING SURFACE EACH 902 SQ FT.
GRATE AREA EACH 25 SQ. FT.
IRON CHIMNEY 36" DIA 74' HIGH
2-6"x3½"x6" STEAM PUMPS
9'x4½' STEEL PL. FAN ¾ HOUSING
27000 CU FT AIR PER MIN AT 91 R.P.M.
10"x12" HORIZONTAL SIDE CRANK ENGINE
91 R.P.M AT 30 LBS. PRESSURE

RADIATION

PRIMARY RADS.	2112 SQ FT
SUPPLEMENTARY	3096 " "
DIRECT	1713½ " "
VENT FLUE SURFACE	596 " "
PIPE COILS	637 " "
TOTAL	8154½ SQ FT

COST OF HEAT + VENT SYSTEM	17621.50
COST PER GROSS CU. FT.	3 CENTS
COST PER CU. FT SPACE HEATED	4.1 CENTS
ENTIRE BUILDING COST PER GROSS CU. FT.	24 CENTS

HEAT AND VENT SYSTEM COST 12% OF TOTAL COST OF BUILDING

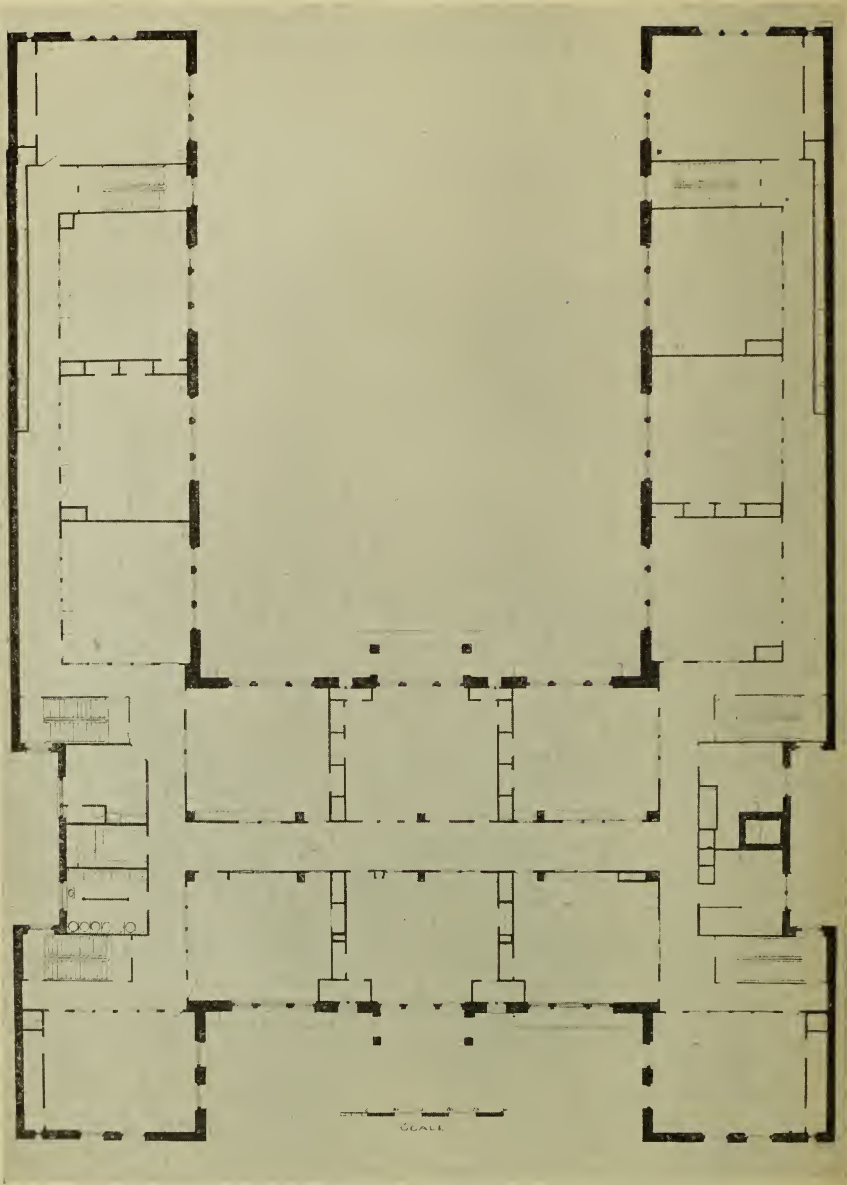
OLIVER HAZARD PERRY SCHOOLHOUSE,
South Boston, Mass.
(Plenum System Heating and Ventilation.) FRENCH & HUBBARD, Engineers.

APPENDIX IX.

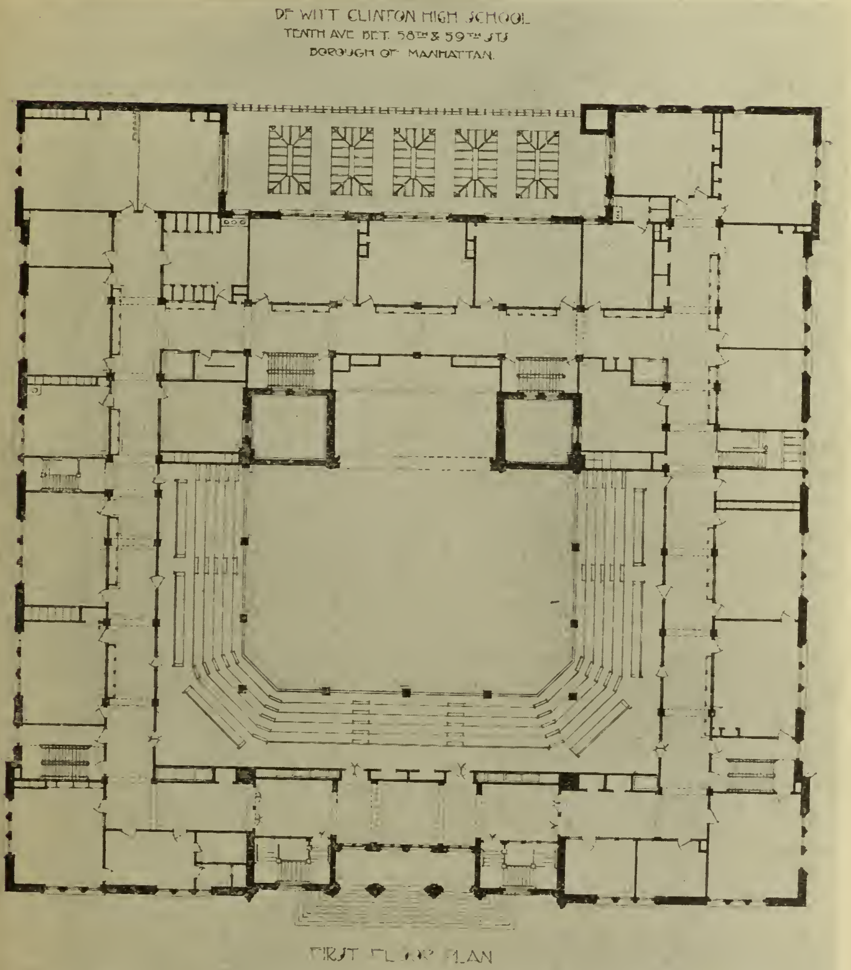
TYPICAL SCHOOLS IN NEW YORK, CHICAGO AND ST. LOUIS.

The New York type is a most skilful adaptation of the necessities of a city block to the requirements of a school, and the development of the plan that is bounded by party walls is particularly good. The chief requirements are (1) for the class-rooms, light; (2) for the play-rooms or gathering spaces, including gymnasiums, accessibility and light, but the latter not so all-important as in class-rooms; (3) for the Assembly Hall, accessibility and a large area, and light; the last no longer of supreme importance, as artificial light will answer, and in many cases (lectures with stereopticon or evening meetings) daylight is of no importance; and (4) the corridors, sufficient for easy circulation with ample light, the stairs sufficient in number and so placed as to allow rapid emptying of the building.

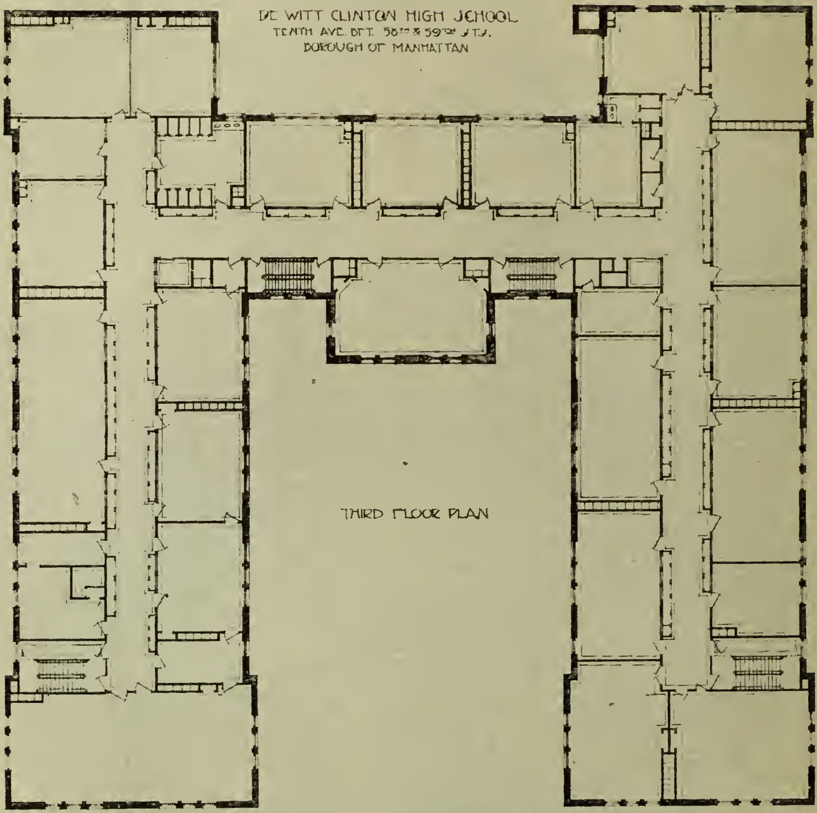
This New York type meets these requirements admirably. (1) The class-rooms get their light from central areas that cannot be interfered with by other buildings, the distances between the arms of the H (about eighty feet) insuring ample opening to the sky. On the lower floors, and especially in the rooms near the internal angles, a larger amount of glass is desirable than what would be ample on the upper stories. The corner rooms have prism glass to help obviate this. (2) The play-rooms or gymnasiums occupying the basement or the street floor, or both, if two stories high, are very convenient and are so planned as to have good daylight. (3) The Assembly Halls, having the gallery on the first floor level, have the main floor but a short flight of stairs below the sidewalk, and are as accessible as it is possible to be. (4) The corridors occupying the space against the party wall depend on light borrowed from the rooms and on light from the small area placed about in the centre between streets on the party wall. At a slight sacrifice of exterior wall (*i.e.*, class-room space) they might have been carried through to the front and had really good light. The stairs are well placed, and, being of the twin type, are double the number that appear on the plans. We believe that a single good staircase at each of these points would be better than a twin staircase, with its feeling of enclosure and of cramped headroom, and the slight confusion caused by the alternating direction of landings, but New York has found them very satisfactory in operation. Inci-



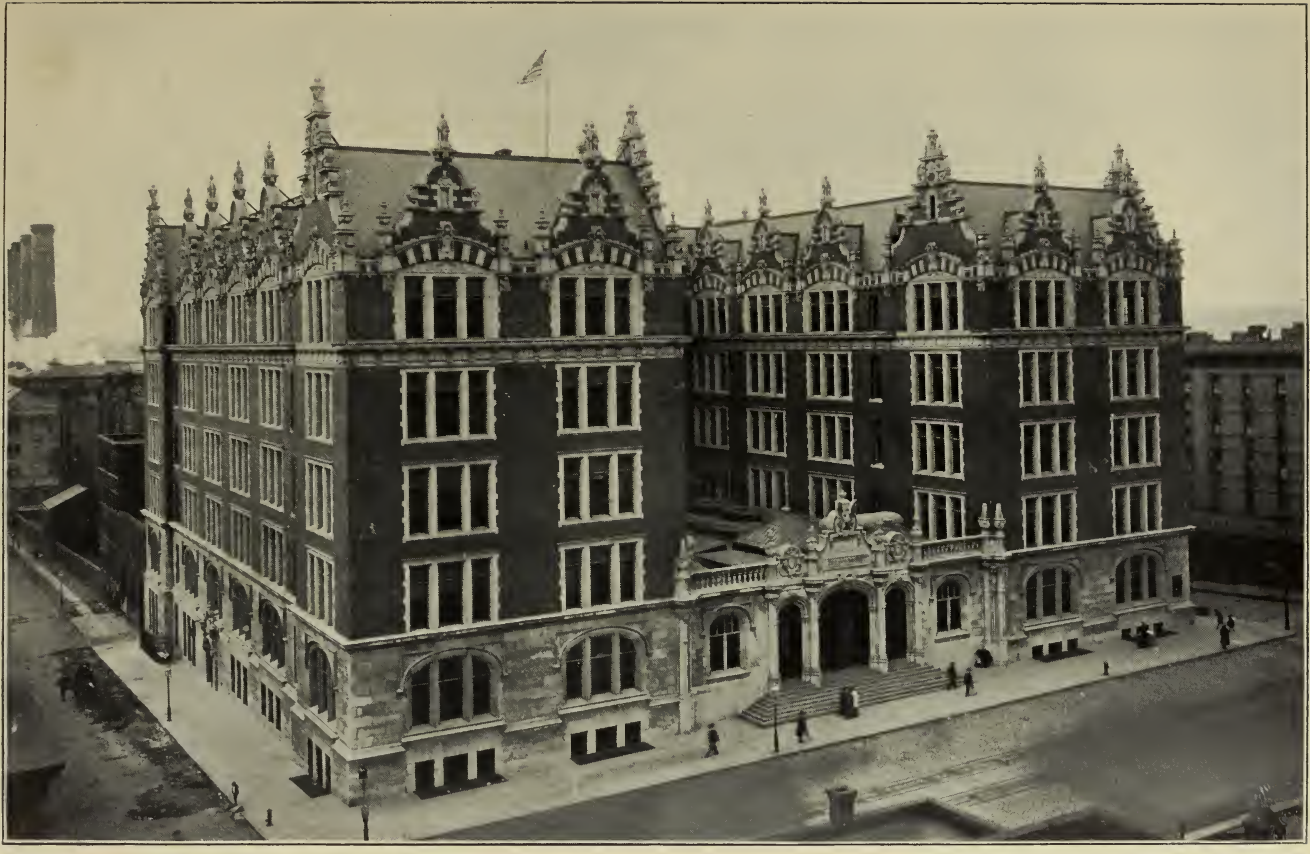
PUBLIC SCHOOLHOUSE NO. 17,
New York, N. Y.
C. B. J. SNYDER, Architect.— Department of Education.



DE WITT CLINTON HIGH SCHOOLHOUSE,
New York, N. Y.
C. B. J. SNYDER, Architect. — Department of Education.



DE WITT CLINTON HIGH SCHOOLHOUSE,
New York, N. Y.
C. B. J. SNYDER, Architect.—Department of Education.



DE WITT CLINTON HIGH SCHOOLHOUSE,
New York, N. Y.
C. B. J. SNYDER, Architect. — Department of Education.

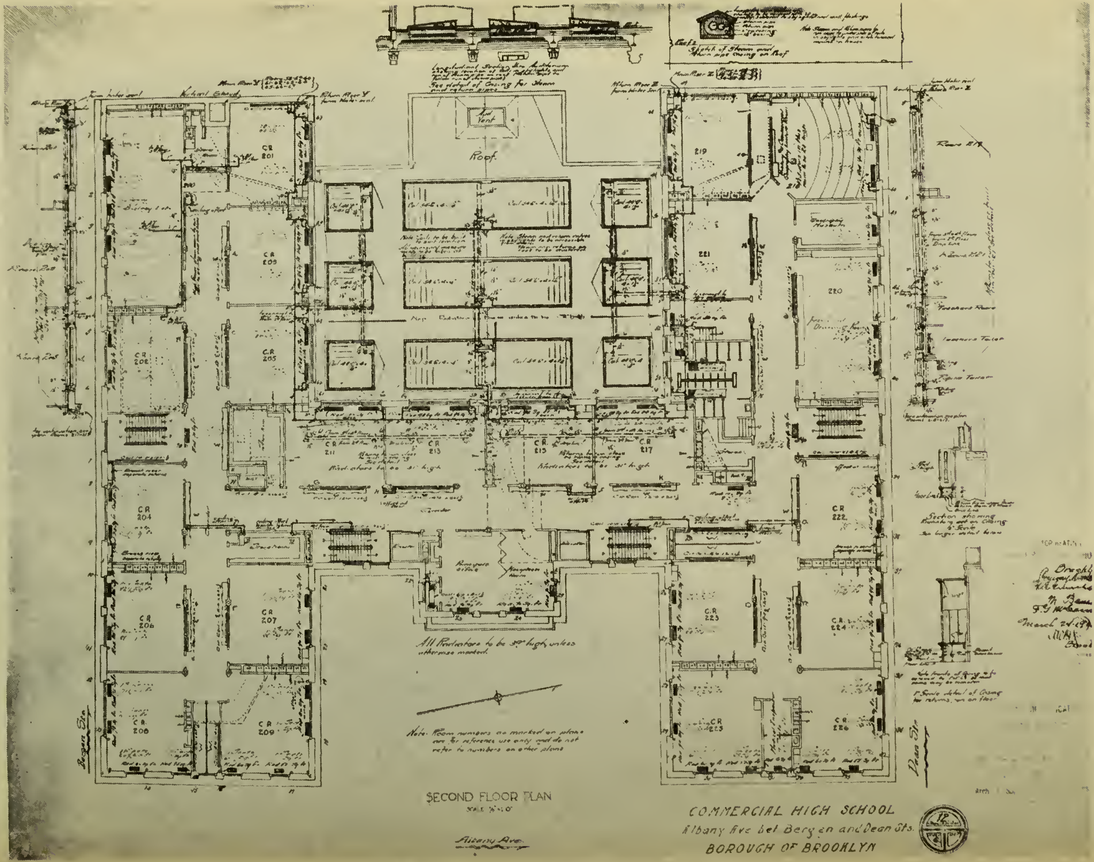
dentally they require a slightly greater distance from floor to floor than what is used in Boston. The plan as a whole answers the chief requirements of a modern school building admirably. The system of wardrobes which in New York has been in corridors and does not seem to be ideal has been replaced in this building by wardrobes with sliding doors, occupying one side of the class-room. The development of this idea is shown in a suggested plan coming from Chicago, which will be noted later. If it proves practicable, it will be economy as compared with the Boston type — independent little rooms adjoining the class-rooms, which is a plan extravagant in area.

The De Witt Clinton High School is an excellent example of the H plan applied to a city block with light on all four sides. The bars of the H have a thickness of two class-rooms and a corridor, the cross-bar is nearer one street and leaves open areas of unequal sizes. The larger, in basement and first floor, forms the Assembly Hall. The smaller, in basement and part of the first floor, forms the gymnasium. The Assembly Hall with its stage, etc., occupies not only the central area, but all the class-room space on the three sides, and the gymnasium occupies the central area at the rear and the class-rooms adjoining. This is an excellent block, good rooms, well placed stairs and economical corridor space, the latter possibly too economical to insure ample outside light, especially when wardrobes are placed in it. The stairs are the twin type. The exterior is a system of bays, which does not express the plan and in many cases gives inadequate light for rooms, which, except for the requirements of the exterior, might have had ample light. This, however, is no reflection upon the general principle of the plan.

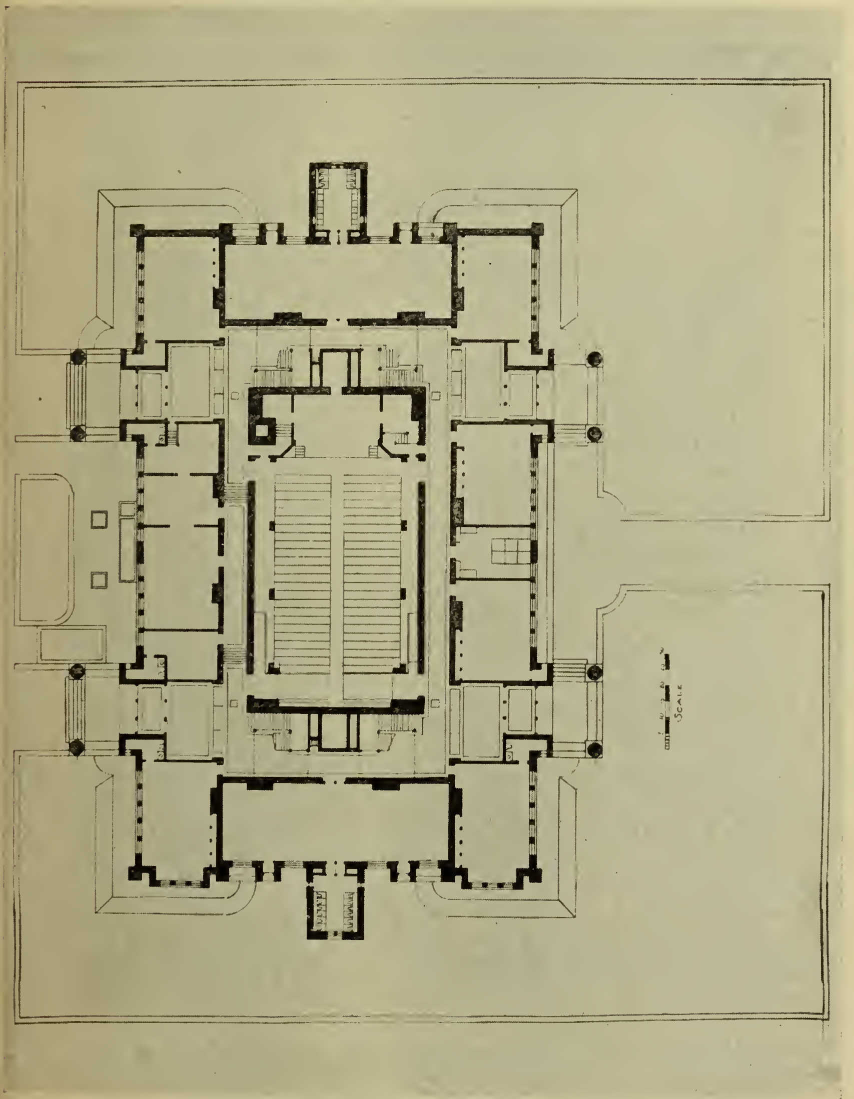
The Commercial High School, one plan, the second floor, of which is given, is the same type as the De Witt Clinton. Both these presuppose very large schools. The Commercial High would make twenty-six standard class-rooms on a floor.

New York depends on a certain amount of direct heat in all rooms, a distinct economy (perhaps a justifiable one), over a complete plenum system, but we feel that fresh air is as important as abundant light. Possibly we provide more than is essential; at all events the Board receives frequent complaints as to draughts.

The Chicago plan is a logical development of the New York block plan. It occupies a complete lot about 300 by 300 feet in size (larger than a New York block). In some respects it is a step in advance of the New York plan. It contemplates having a low basement, given up wholly to heating apparatus, the heating, unlike the New York plan, being wholly from a fan. The first floor is on the street level, with the Assembly Hall in the centre, wholly top-lit, and the rooms surrounding it comprise not only class-rooms, but also the play-rooms, toilets, etc., which would ordinarily be in the basement. The toilets in this plan are distributed on the various floors. The play-room is also equipped as a gymnasium. It is quite ideal to have so much on the street



COMMERCIAL HIGH SCHOOLHOUSE,
Brooklyn, N. Y.
C. B. J. SNYDER, Architect. — Department of Education.



SKETCH, NEW TYPE PUBLIC SCHOOL BUILDING,

Chicago, Illinois.

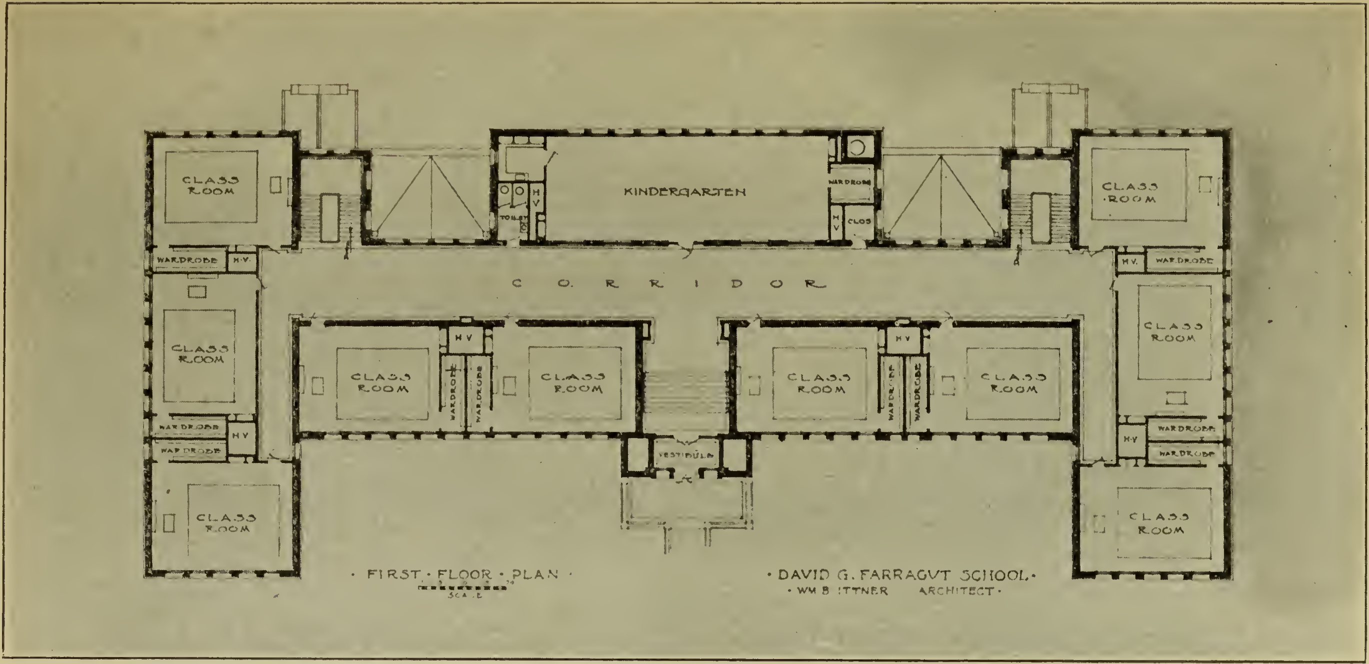
D. H. PERKINS, Architect.—Board of Education.

level, and having no children in the space below grade is a very decided advantage. On this large plan of sixteen rooms on a floor, there is opportunity on this first floor for the play-rooms for the boys and girls above referred to, for the offices of administration and also for six class-rooms. The Assembly Hall is accessible from all four corners. Additional light for the boiler-room below is obtained by making the rooms of administration, which are all small rooms, of lower stud, the floor being above the general level of the first floor. Tested by our floor plan test this gives the following results, showing that it is not an economical floor plan, for notwithstanding the economy of the small wardrobes, the upper floor plans are considerably more than twice class-room area :

Cubical contents . . .	1,835,475 cubic feet.
Area, second floor . . .	27,114 square feet.
Area, 16 class-rooms . .	11,616 square feet.
Cubic feet per class-room (54),	33,990 cubic feet.

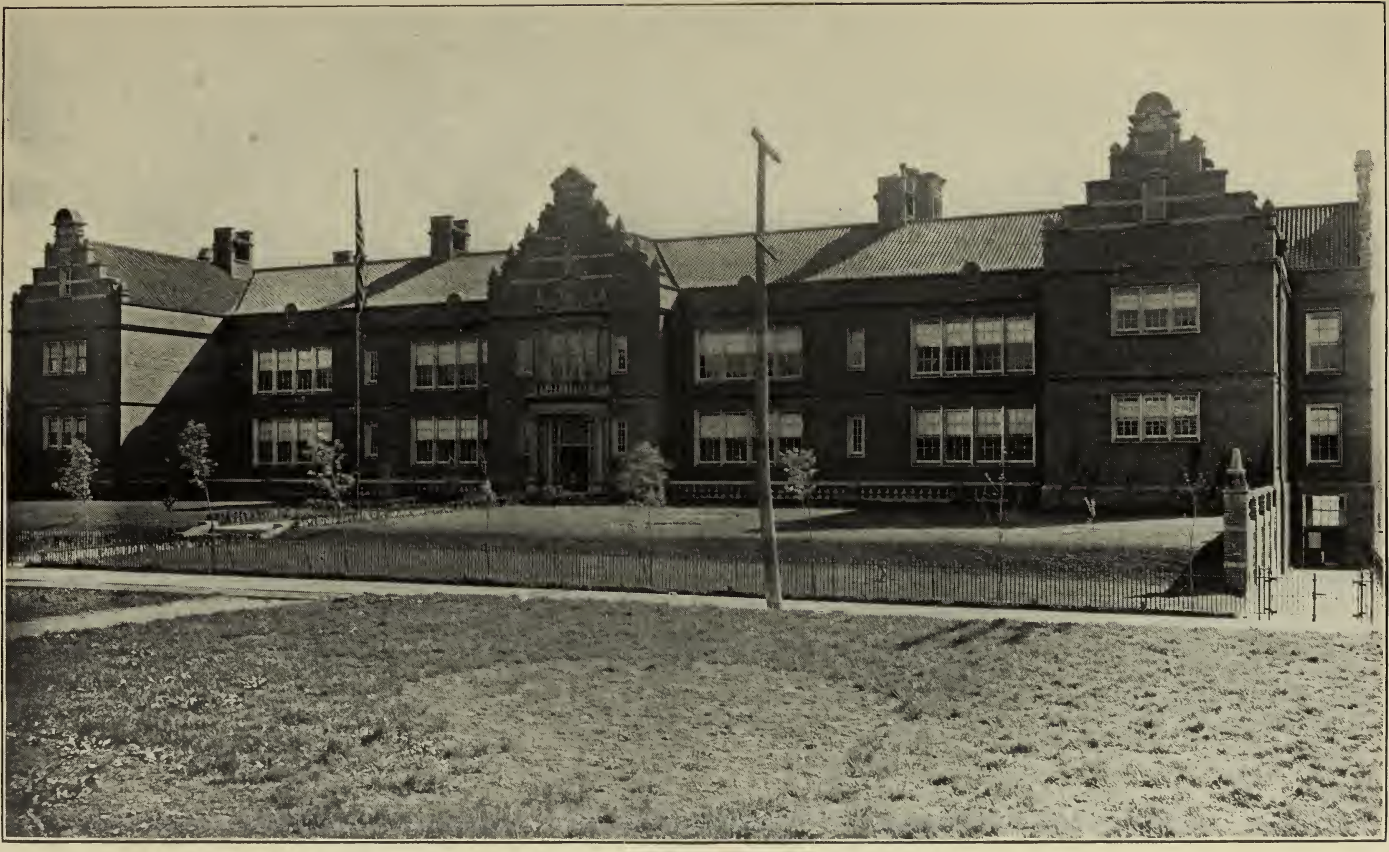
On cubic contents it is far below our limit of 40,000 cubic feet per class-room. Here there are six class-rooms on the first floor and 16 each on the second, third and fourth, a total of 54, which would allow with us a cube at 40,000 of 2,160,000. It is, however, to be noted that the rooms, 22 by 33, are the area of our primary standard (24 by 30) and will not accommodate an average of 50. So that from the point of accommodation it is not yet reduced to the economical minimum. The points about the plan which seem to have a direct bearing on our problems are the abandonment of the occupation of the basement by anything except the heating apparatus, and keeping the first floor down, and distributing the toilets on the various floors, thus reducing the amount so as not to have additional expenditure. Instead of separate wardrobes it is proposed to utilize the wardrobe in the room as the mouth, as it were, of the vent. All foul air goes through the wardrobe and then out. It is doubtful if this is hygienically wise, and the varying bulk of clothing hung there might have a distinct influence on the flow of air. The wardrobes are closed by doors that slide up, and which, when down, have blackboard surface. On a very large plan, and both the Chicago and New York schemes require a very big building, there is space to spare on the first floor for a few class-rooms, and compared with a building having a basement and three stories, this building, even without an additional story, would have a large accommodation, and with an additional story the class-rooms on the first floor would be a net addition over the old scheme of three stories, although the top floor, the fourth, would be but a half story higher than the other third floor. The through corridors with their ready access to either street are excellent, and even on the first floor are well lighted.

Both these plans, however, presuppose schools of such size as are never contemplated for Boston, and hardly likely ever to be



DAVID G. FARRAGUT SCHOOLHOUSE,
St. Louis, Missouri.
WILLIAM B. ITTNER, Architect.

required. The St. Louis type is therefore much more like an attempt to solve our own problem here. The plan illustrated is a fair example of an ideal open, well lighted school, a very large lot, admitting of an extended plan and a twenty-four room building on two floors only. All this is quite ideal, but, until land and building are cheaper it is too ideal a plan for any part of Boston, except outlying suburbs, like the borders of West Roxbury, where land is still cheap. This building, judged on its cost per cubic foot, is economical and the price far below what we must pay per cubic foot. Examined, however, by the standard of accommodation, it is seen to be an expensive school, and the cost per cube is low only because corridor and roof space, of no service educationally, are less expensive than class-room space. The plan is a generous one, its area being far more than double the area of the class-rooms; its cube is excessive, being more than 30,000 cubic feet per class-room. On our standards, 24 class-rooms at 30,000 cubic feet, would have given the limit of the cube as 720,000, but the St. Louis cube is 977,200 cubic feet; and 22 cents by 720,000 would have put the cost at $158,400, but the St. Louis school cost $190,000. To be sure this $158,400 is the Boston "low limit," which has rarely been reached, but the Sarah J. Baker School, a 24-room building, as is the St. Louis one, was built, without bonus, for $157,344.23. We may at least learn from the St. Louis school the desirability of keeping our suburban schools strictly to two stories in height.



HENRY T. BLOW SCHOOLHOUSE,
St. Louis, Missouri.
WILLIAM B. ITTNER, Architect.

APPENDIX X.

TECHNICAL AND INDUSTRIAL EDUCATION IN ENGLAND.

Anything that tends to bring the Board of Schoolhouse Commissioners into touch with the trend of educational affairs, and so to be prepared to meet conditions likely to arise, is cognate to its work. It may not, therefore, be amiss to give a few notes on the work being done in England by the Board of Education for England and Wales, and in particular for London, by the School Committee of the London County Council. The information is drawn from the following Blue Books:

Code of Regulations for Public Elementary Schools,
Report of Consultative Committee upon Higher Elementary Schools,
Regulations for Secondary Schools,
Regulations for Defective Children,
Regulations for Instruction and Training of Pupil-Teachers,
Regulations for the Training of Teachers,
Regulations for Technical Schools, Schools of Art, etc.,
Suggestions for the Consideration of Teachers,

and from the following publications of the London County Council on technical education under the supervision of the London County Council:

Report of the Woolwich Polytechnic School,
Report of the Camberwell School of Arts and Crafts,
Report of the L. C. C. School of Building at Brixton,
Report of the Northampton Institute,
Report of the Birkbick Institute,
Report of City of London College,
Report of Southwestern Polytechnic School,
Report of Northern Polytechnic School,
Report of L. C. C. Shoreditch Technical Institute,
Report of L. C. C. School of Photo-Engraving & Lithography,
Report of L. C. C. Paddington Technical Institute,
Report of L. C. C. School of Engineering & Navigation,

and other reports on training schools, and from personal interviews between officers of the Board of Educators and the chairman.

One of the most important points seemed to be the thorough organization of educational work which came under the control of the central board, such as the Board of Education of England and Wales. Such organization as this means that the central body is in constant touch with all the educational work that is being done in England and Wales through reports of the masters and principals and through the reports of their own superintendents or inspectors. The value of the information accumulated in this way is readily seen by reading any of their reports. Take for example the single report, the "Suggestions for the Consideration of Teachers." These suggestions are drawn up by the Board of Education, who in each case have employed some special expert on a particular subject, who has embodied in his suggestions the result of his own experience, modified by consultation with other teachers in the same line and a comparison of their experience with his. Or, again, the Report of their Committee upon Higher Elementary Schools, where, not content with examining the reports of teachers or superintendents or examining the children themselves, they extended their inquiries among manufacturers who were employing the children thus educated, and embodied the results of these inquiries in a statement which came with authority as to the character of education which seemed to them to be properly demanded for children who were to leave school at the age of fourteen or fifteen.

This organization of the work under a central body means, as applied, for example, to London, that there is a systematic progression through all the schools that are supported out of the public funds, and that these schools carry the children through the elementary grades, dividing them as they finish this course between those who are to go to work and those who go a step further. Those who go further and take secondary education are again divided, and the work differentiated for those whose education stops here and those who intend going still further. Those who go further can be guided either along purely academic lines towards the universities, or along technical lines towards the great polytechnic schools, or along industrial and commercial lines toward trade and the industries. Although there are fees in practically all grades above the elementary, they are in most cases nominal and can nearly always be remitted entirely in case of need, and, moreover, are offset by numerous scholarships, so that no earnest student need ever miss education for lack of means, and the fees presumably tend to discourage those who are not capable and worthy of receiving the advantages of higher education.*

Another advantage of a central organization is that this body is able to make frequent tests to determine whether or not a given course of study is fulfilling its end. A slight attempt at something of this sort was recently made by a State Committee to find out whether the instruction given generally in our cooking schools was of any practical value. This investigation was quite an exception, and one may add that it was not a report that was very encouraging to those who are interested in this branch of teaching; but reports of this kind are made constantly on all subjects in England, so that the authorities are kept informed as to the results of their expenditures for this or that branch of instruction and know whether or not the money is being wisely expended. Not only is such examination useful for this purpose, but it is also useful as helping to determine whether a student shall be encouraged to go further or not. Through all the stages of education that have been outlined above the student is not left to his own resources, but, even when he has selected his especial course, is constantly guided and helped in choosing such additional courses as the educational authorities believe to be desirable for his general development, so as to prevent a student from going through and graduating a mere specialist.

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* For American readers it is to be noted that the so-called Public Schools in England are not what we call public schools, but are more analogous to Exeter, Andover or Groton, large endowed boarding schools, and that the universities referred to above would correspond to city universities, like New York, rather than to private universities like Oxford on the other side or like Harvard and Yale here.

One cannot doubt that it would be an immense advantage to the Board of Schoolhouse Commissioners if, for example, the State Board of Education were in constant touch with the work that was being done in Boston, and also with the work done in Springfield or Worcester, or any smaller country town; or if, through the State, we could learn just what was the best line of educational work for Lynn or Brockton and whether it was desirable to modify this in any way for Gloucester. It would be an immense advantage to the Board in Boston to know not only what is being done educationally elsewhere, but what is being done in planning and building. As it is the Board makes its own experiments, and if it is to learn anything whatsoever from the experience of others, it must itself visit other towns or cities and collect this material. If a central body collected and compared material of the same sort from all over the State, unquestionably there would be most valuable results. Still more valuable would be the results if the States themselves filed their reports with the Federal Government and a central bureau there published still fuller and more comprehensive statistics.

It is many years since Germany awoke to a full realization of the importance of technical education, particularly of that which had a direct bearing on the commercial prosperity of the country. Later, England has taken up the same consideration. Very tardily, struggling in the rear of both of these countries, the United States is now beginning to consider this very important branch of education.

The work in England has been done with thoughtful attention to detail, but with lack of that over-scientific organization which is characteristic of the method of working in Germany. As a result, the Report of the London County Council on Technical Education, which is under their supervision, is an extremely interesting document. London is so large and so cosmopolitan as to include within its area all classes, all nations, and all kinds of industry. The technical schools have developed along the lines that seem to be suggested by the environment of each particular school, so that of the large number of trade and technical schools that are more or less under the control of the London County Council, no two are the same in equipment or work, and they vary from such advanced schools as the Woolwich Polytechnic, which covers somewhat the field of our Institute of Technology, to a school that specializes in a particular subject, as is the case with the School of Photo-Engraving and Lithography. Nearly all of these schools have been established within recent years. The London County Council is planning adding to the existing ones and building new ones, and the work is taken up by the students with enthusiasm. It is nearly all evening work, and adapted especially for those who are at work in the daytime. The small fees insure regularity of attendance and thorough co-operation of the students themselves. The central authority, the superintendent and teachers, work together to see that each individual student is guided so that he may get the greatest possible advantage out of the number of hours that he devotes each week to this evening work. Practically all of the schools have a day department as well, but this is generally less advanced work for younger pupils.

Higher commercial education, which has been occupying our attention in Boston somewhat during the last year or two, was made the subject of study by a special committee who some five years ago investigated the subject thoroughly and made a comprehensive report. It is characteristic of English methods that this thorough study and investigation were made before they attempted to carry on further commercial education, and that they recommended better provision for commercial education in secondary schools, *i.e.*, our high schools, and the establishment, in at least one school of the first grade, of a department devoting itself primarily to the preparation for business life of boys leaving school at eighteen or nineteen, and not expecting or intending to carry their education further. They then recommended that in the University of London special opportunity should be provided in the subject of higher commercial education, and that, in addition, travelling scholarships be offered, to enable teachers with some experience to study in higher commercial institutions abroad.

One other thing is forced upon one in reading these English reports. Notwithstanding the great growth that has taken place in technical and industrial education during the last ten years in England, a growth that has followed closely on the lines laid down by Germany, and which at present is hardly touched upon in this country, the English reports are constantly laying emphasis on the necessity of thorough general education, as being of far greater importance in any walk of life than the technical training. In fact their reports would seem to state that, unless the groundwork of the education, the knowledge of English, its literature and its history, the knowledge of the simpler branches of mathematics and geography, is the foundation, the trade education even is of very little benefit; and all through the trade and technical schools where the courses are elective the authorities are constantly urging the students to supplement their technical work with work which might be described as general education. It is certainly an open question with us whether the children were not better educated three or four generations ago when they were held more closely to elementary things, and were not filled with a smattering of an indefinite number of so-called scientific subjects. All of which has a direct bearing upon that Board which has to do with the equipment of the buildings for educational purposes.

Another point which is interesting, but not surprising to find in an English report on education, is the very strong emphasis that is laid upon sport. Out-of-door sports in particular are considered an essential part of the curriculum of any well regulated school, and count as such in the regulations for the public elementary schools. This report states that — "The lessons to be learned in the playground are indeed invaluable. Children, who take part in properly organized games, will learn to 'play the game,' to 'give and take,' to devote themselves to and efface themselves for a common cause, to feel pride in the achievements of others, to accept victory with becoming modesty and defeat with due composure, and, speaking generally, to acquire the spirit of discipline, of corporate life and of fair play."

Moral instruction is a subject on which one would imagine reports in England just now would touch with a light hand, although on the spot one gathers that the excitement over the Education Bill is much more political than anything else, and appears to have about as much effect on the every day operation of the schools as would the question of admitting Japanese school children to the schools on the Pacific coast affect our schools in Boston.

It is perhaps sufficient to note that the Code states that the purpose of all moral training is "to form and strengthen character, to develop intelligence, and to make the best use of the school years available; to aim to train children in habits of observation and clear reasoning, that they may gain intelligent acquaintance with facts and laws of nature; to arouse in them a living interest in the ideals and achievements of mankind; to bring them to some familiarity with the literature and history of their own country; to give them some power over language as an instrument of thought and expression; to develop taste for good reading and thoughtful study; to encourage their natural activities of hand and eye by suitable forms of practical work and manual instruction; to afford them opportunity for the healthy development of their bodies, not only by training them in appropriate physical exercises, and encouraging them in organized games, but by instructing them in some of the simpler laws of health; to implant habits of industry, self-control and courageous perseverance in the face of difficulties; to teach them to reverence what is noble, to be ready for self-sacrifice, to strive their utmost after purity and truth, to foster a strong sense of duty, to instill that consideration and respect for others which must be the foundation of unselfishness and the true basis of all good manners; while the corporate life of the school should develop, especially in the playground, that instinct for fair play and loyalty to one another which is the germ of a wider sense of honor in later life."

ALLIED PRINTING TRADES UNION LABEL COUNCIL BOSTON MASS 21

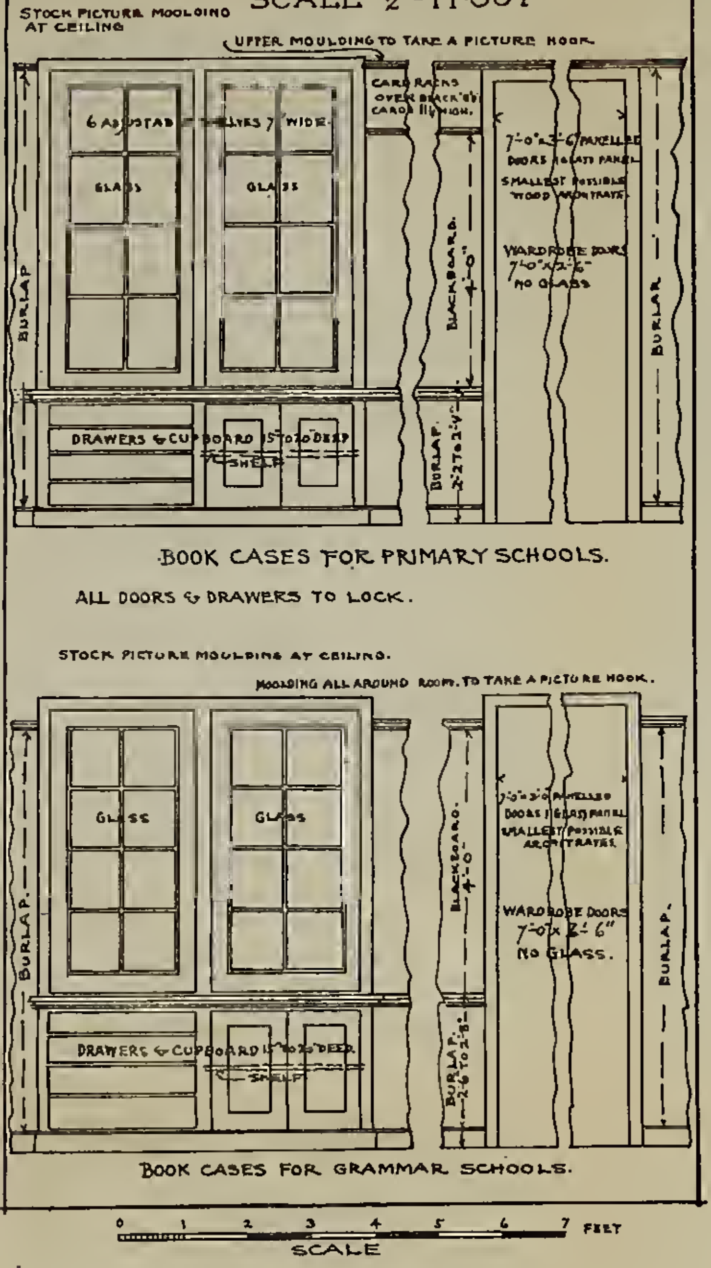
APPENDIX XI.

STANDARDS OF GENERAL DETAIL

CITY OF BOSTON SCHOOLHOUSE DEPARTMENT

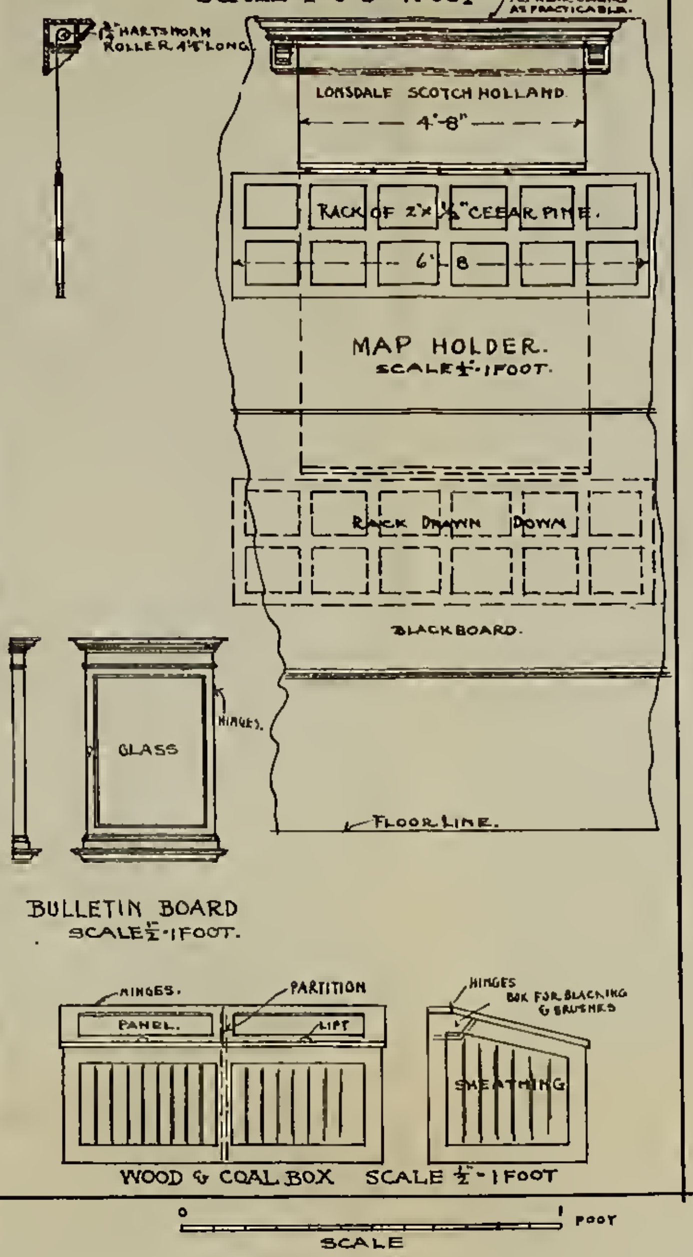
BOOK CASES

SCALE ½" = 1 FOOT


STOCK PICTURE MOULDING AT CEILING
UPPER MOULDING TO TAKE A PICTURE HOOK.
6 ADJUSTABLE SHELVES 7" WIDE.
GLASS
GLASS
CARD RACKS OVER BLACKBOARD CARDS 11" HIGH.
7'-0" x 3'-6" PANELLED DOORS 1 GLASS PANEL
SMALLEST POSSIBLE WOOD ARCHITRAVE.
WARDROBE DOORS 7'-0" x 2'-6" NO GLASS
BLACKBOARD 4'-0"
BURLAP
BURLAP 2'-2" TO 2'-4"
DRAWERS & CUPBOARD 15" TO 20" DEEP
SHELF
BOOK CASES FOR PRIMARY SCHOOLS.
ALL DOORS & DRAWERS TO LOCK.
STOCK PICTURE MOULDING AT CEILING.
MOULDING ALL AROUND ROOM. TO TAKE A PICTURE HOOK.
GLASS
GLASS
7'-0" x 3'-0" PANELLED DOORS 1 GLASS PANEL
SMALLEST POSSIBLE ARCHITRAVES.
WARDROBE DOORS 7'-0" x 2'-6" NO GLASS.
BLACKBOARD 4'-0"
BURLAP.
BURLAP. 2'-6" TO 2'-8"
DRAWERS & CUPBOARD 15" TO 20" DEEP
SHELF
BOOK CASES FOR GRAMMAR SCHOOLS.
0 1 2 3 4 5 6 7 FEET
SCALE

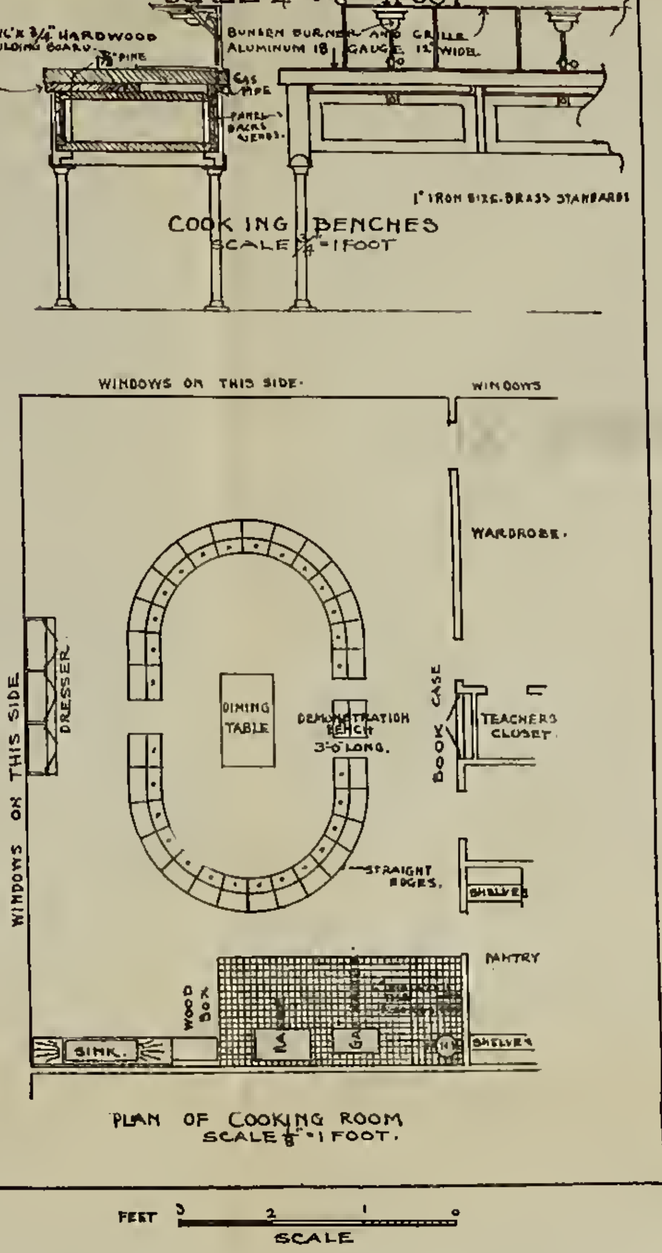
MAP HOLDER, BULLETIN BOARD, ETC.

SCALE ½" & 3" - 1 FOOT



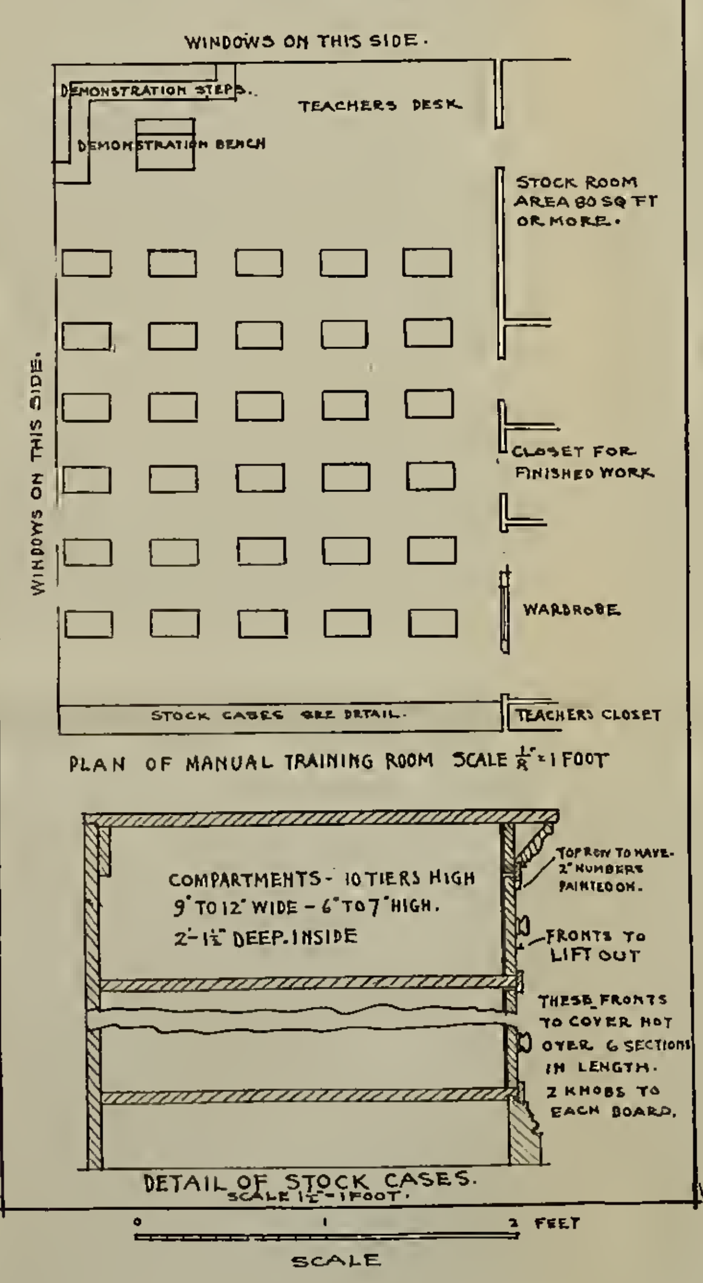
COOKING ROOM & FITTINGS

SCALE ¾" & ⅛" = 1 FOOT



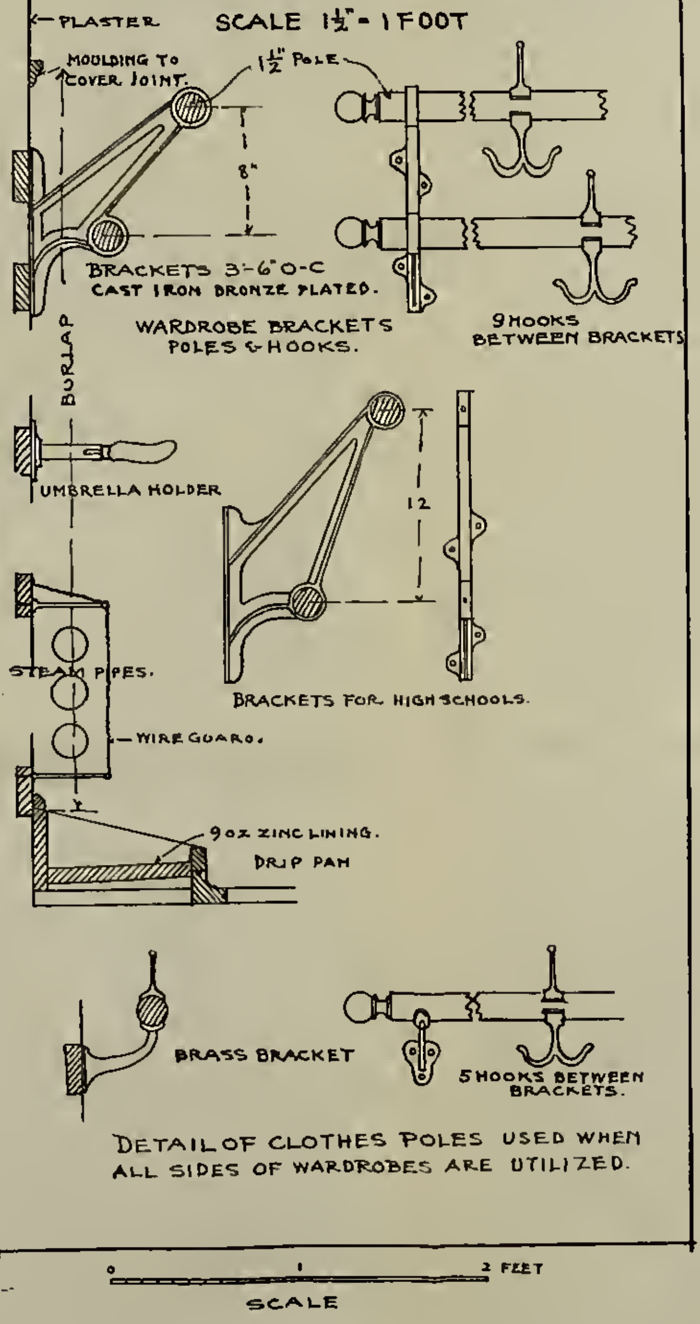
MANUAL TRAINING ROOM

SCALE 1½" & ⅛" = 1 FOOT


WINDOWS ON THIS SIDE.
DEMONSTRATION STEPS.
TEACHERS DESK
DEMONSTRATION BENCH
STOCK ROOM AREA 80 SQ FT OR MORE.
CLOSET FOR FINISHED WORK
WARDROBE
WINDOWS ON THIS SIDE.
STOCK CASES SEE DETAIL.
TEACHERS CLOSET
PLAN OF MANUAL TRAINING ROOM SCALE ⅛" = 1 FOOT
COMPARTMENTS - 10 TIERS HIGH 9" TO 12" WIDE - 6" TO 7" HIGH. 2'-1½" DEEP. INSIDE
TOP ROW TO HAVE 2" NUMBERS PAINTED ON.
FRONTS TO LIFT OUT
THESE FRONTS TO COVER NOT OVER 6 SECTIONS IN LENGTH. 2 KNOBS TO EACH BOARD.
DETAIL OF STOCK CASES.
SCALE 1½" = 1 FOOT.
0 1 2 FEET
SCALE

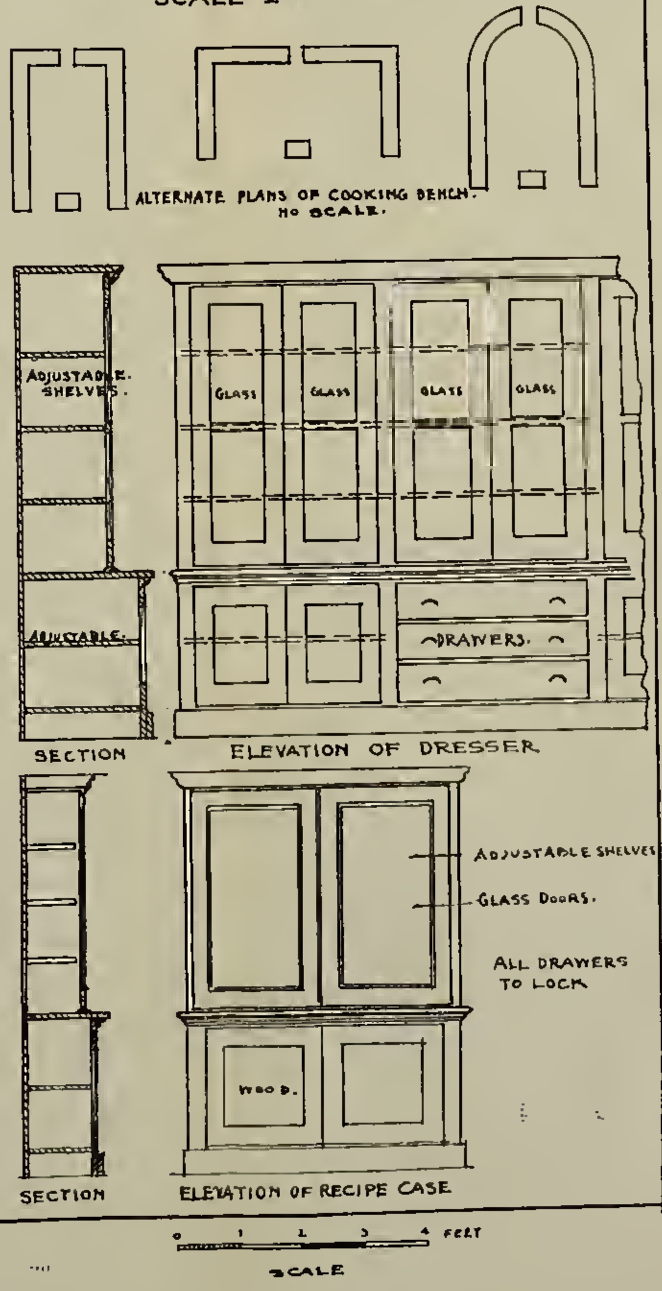
WARDROBE FITTINGS

SCALE 1½" = 1 FOOT


PLASTER
MOULDING TO COVER JOINT.
1½" POLE
8"
BRACKETS 3'-6" O-C CAST IRON BRONZE PLATED.
WARDROBE BRACKETS POLES & HOOKS.
9 HOOKS BETWEEN BRACKETS
BURLAP
UMBRELLA HOLDER
12
STEAM PIPES.
BRACKETS FOR HIGH SCHOOLS.
WIRE GUARD.
9 oz ZINC LINING.
DRIP PAN
BRASS BRACKET
5 HOOKS BETWEEN BRACKETS.
DETAIL OF CLOTHES POLES USED WHEN ALL SIDES OF WARDROBES ARE UTILIZED.
0 1 2 FEET
SCALE

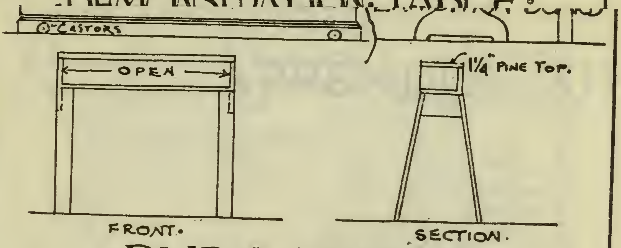
COOKING ROOM FITTINGS

SCALE ½" = 1 FOOT.



·CITY· OF·BOSTON·
·SCHOOLHOUSE·DEPARTMENT·

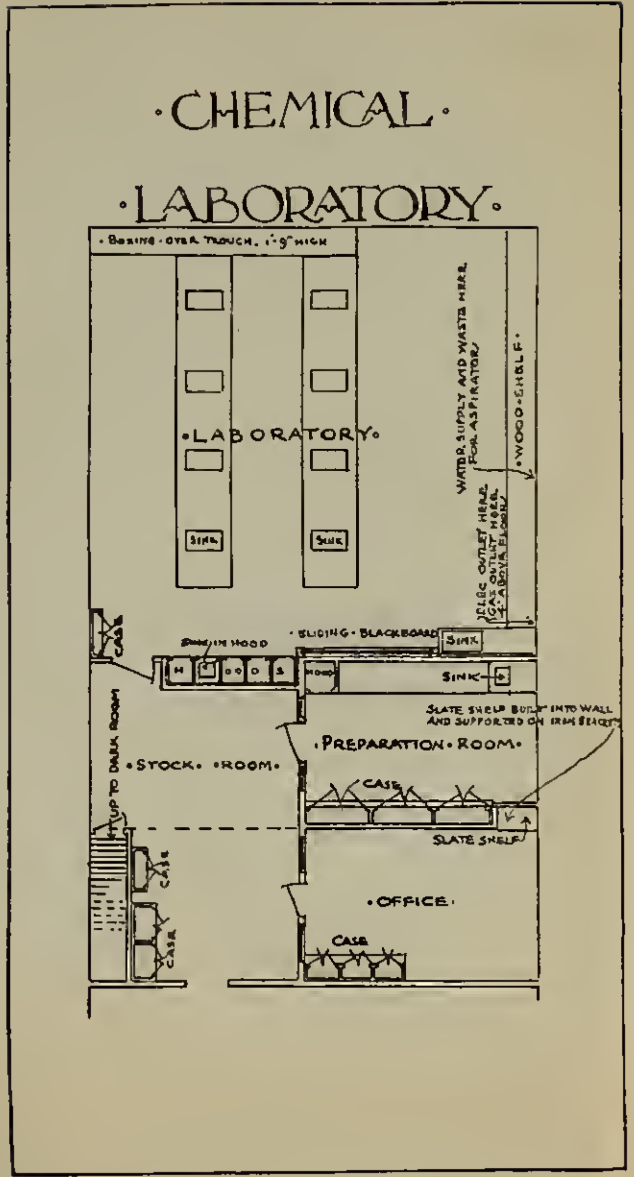
·DEMONSTRATION·TABLE·

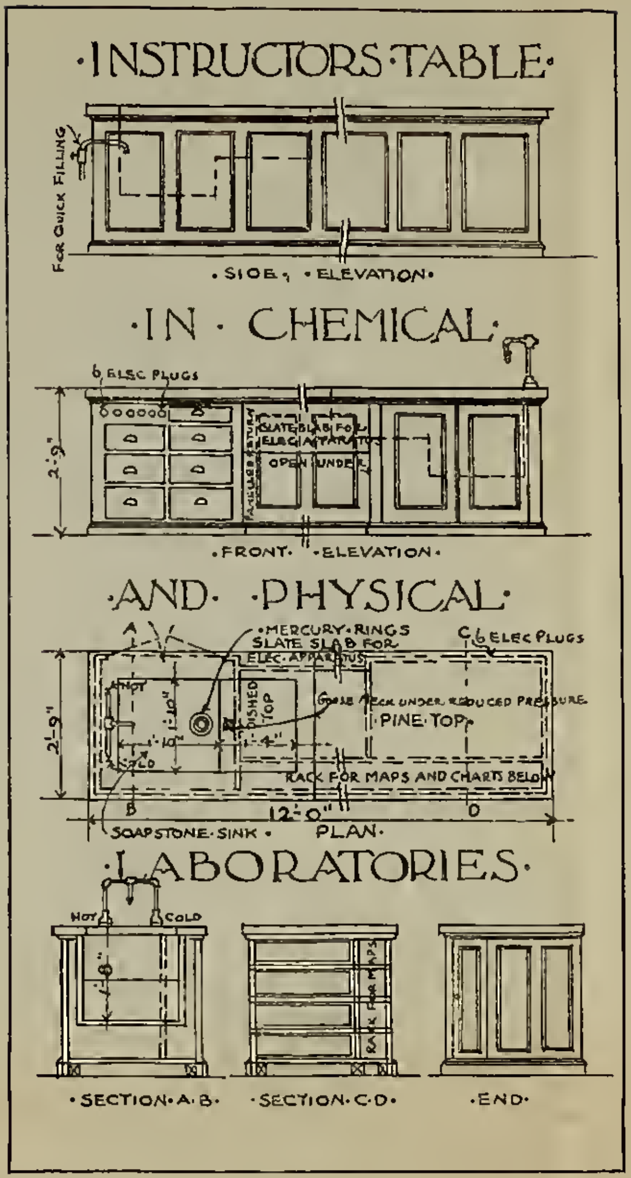


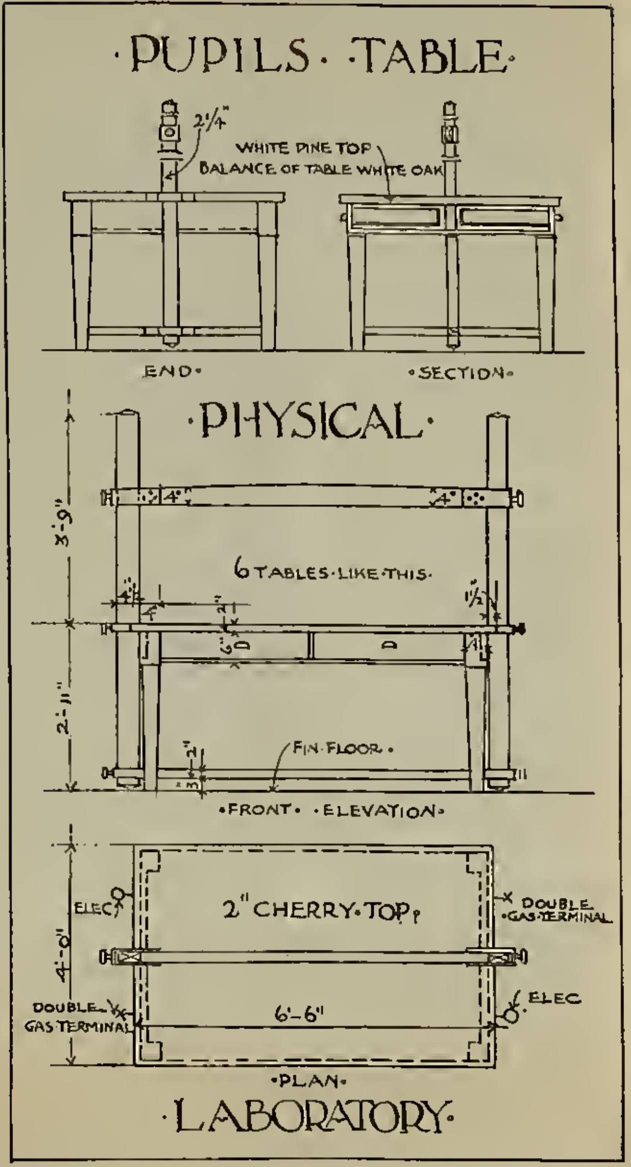
·PUPILS·TABLE·

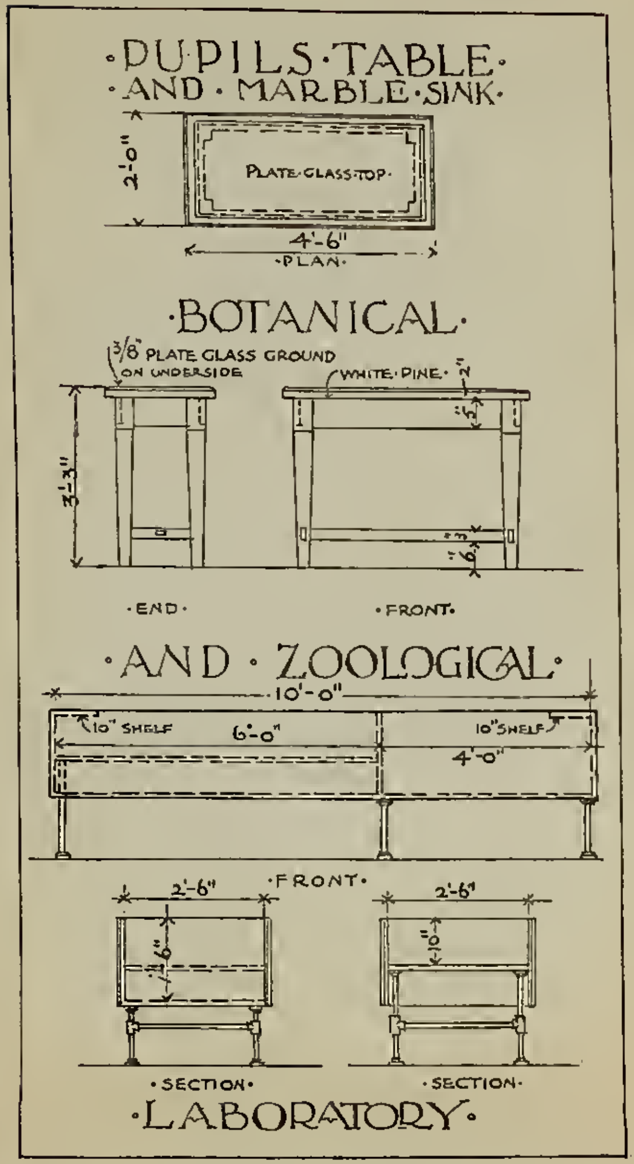
HIGH SCHOOL STANDARD FITTINGS

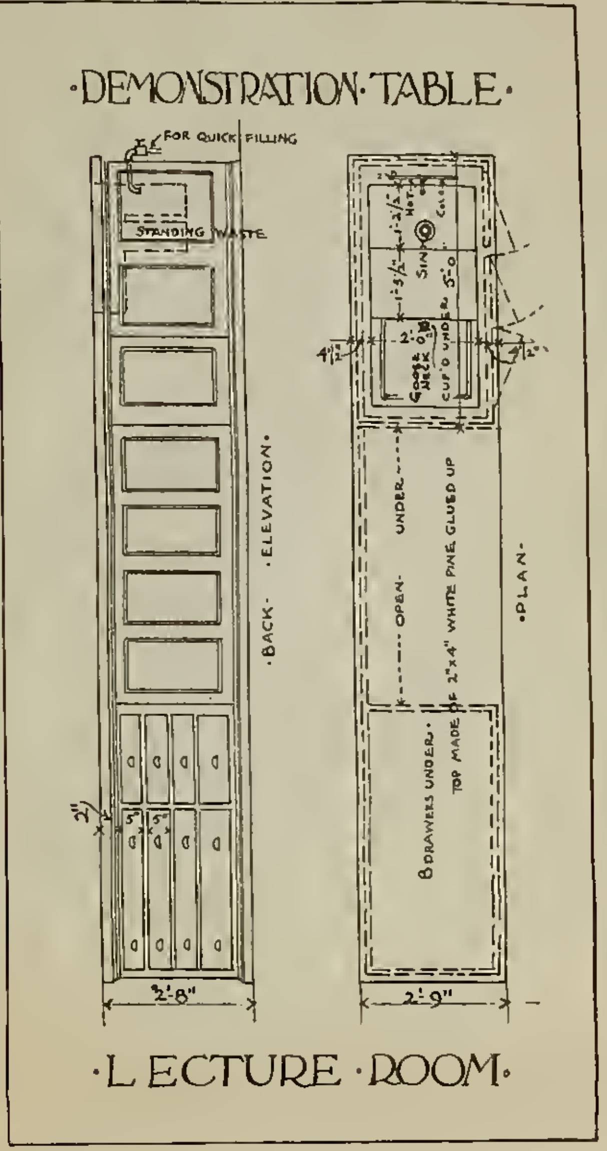
CITY OF BOSTON
SCHOOLHOUSE DEPARTMENT

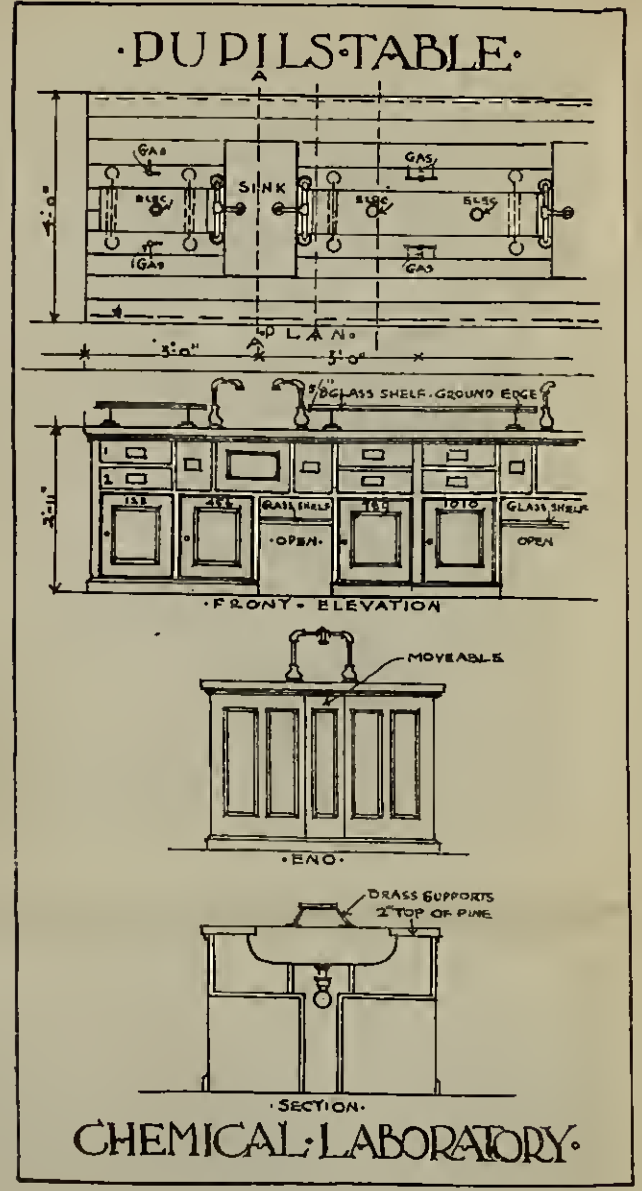

CHEMICAL LABORATORY

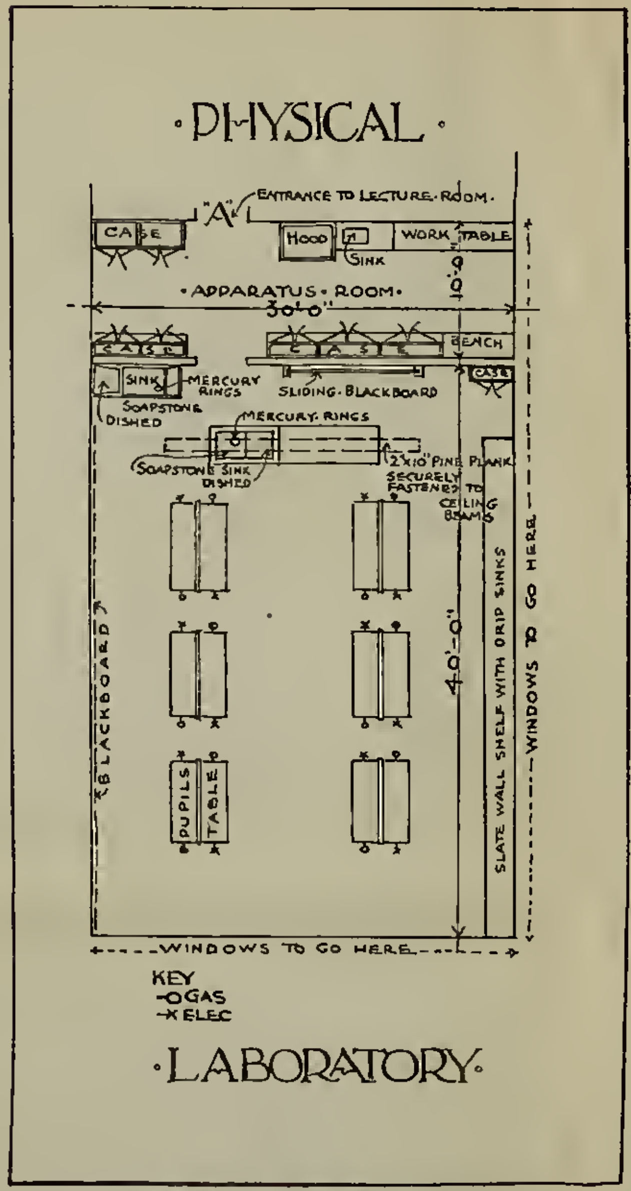

INSTRUCTORS TABLE IN CHEMICAL AND PHYSICAL LABORATORIES

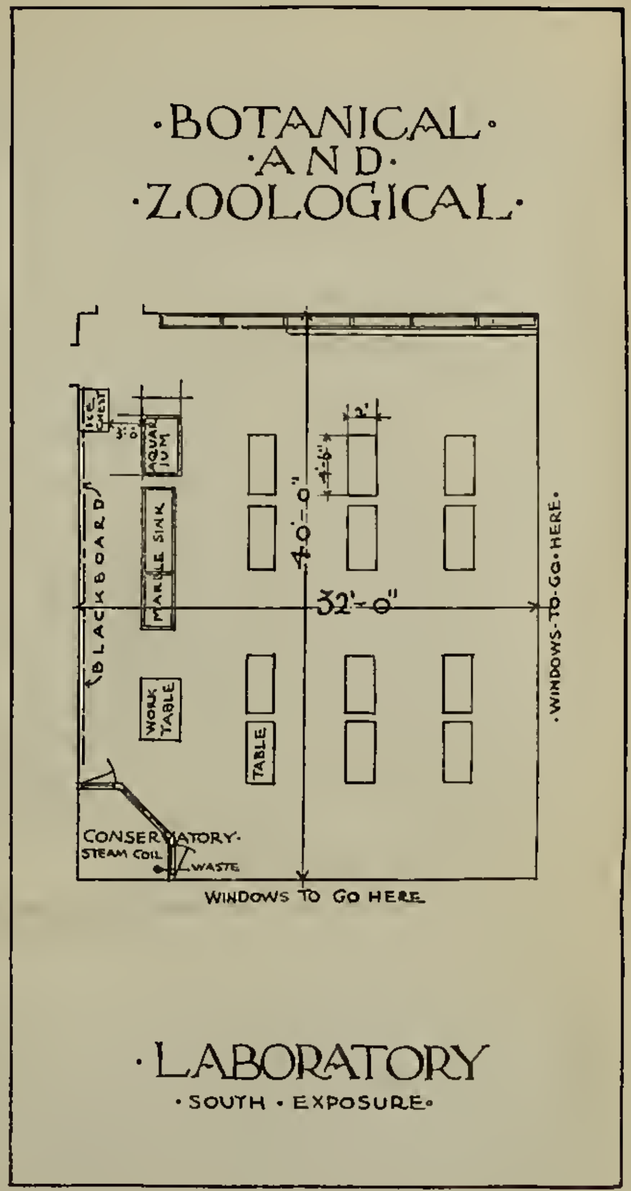

PUPILS TABLE PHYSICAL LABORATORY

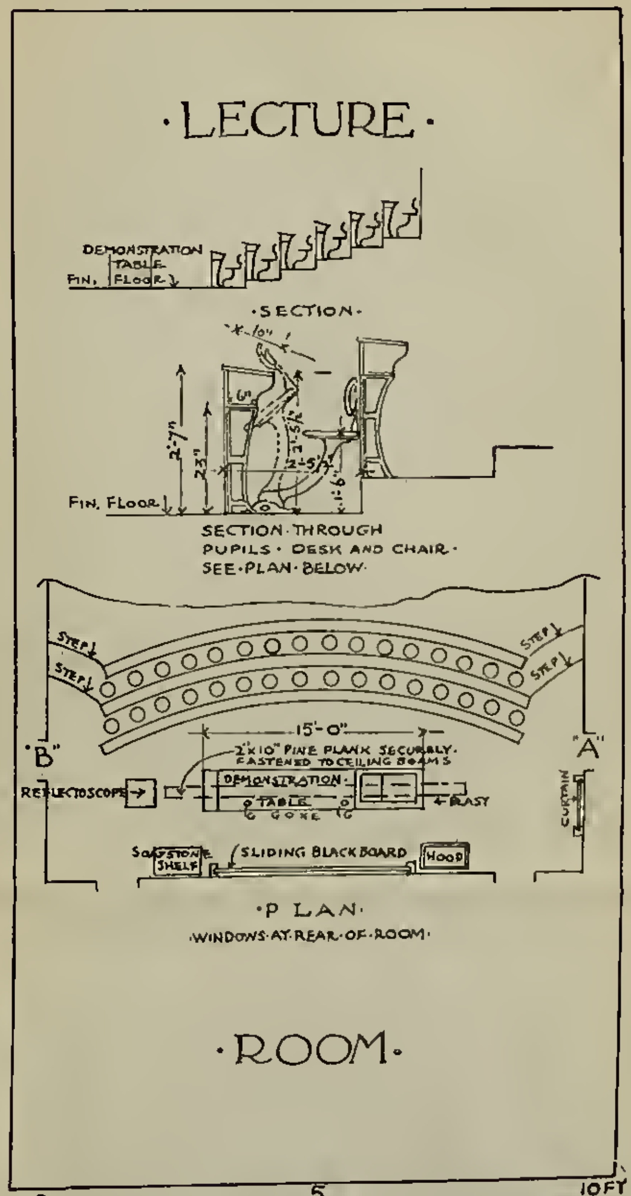

PUPILS TABLE AND MARBLE SINK BOTANICAL AND ZOOLOGICAL LABORATORY

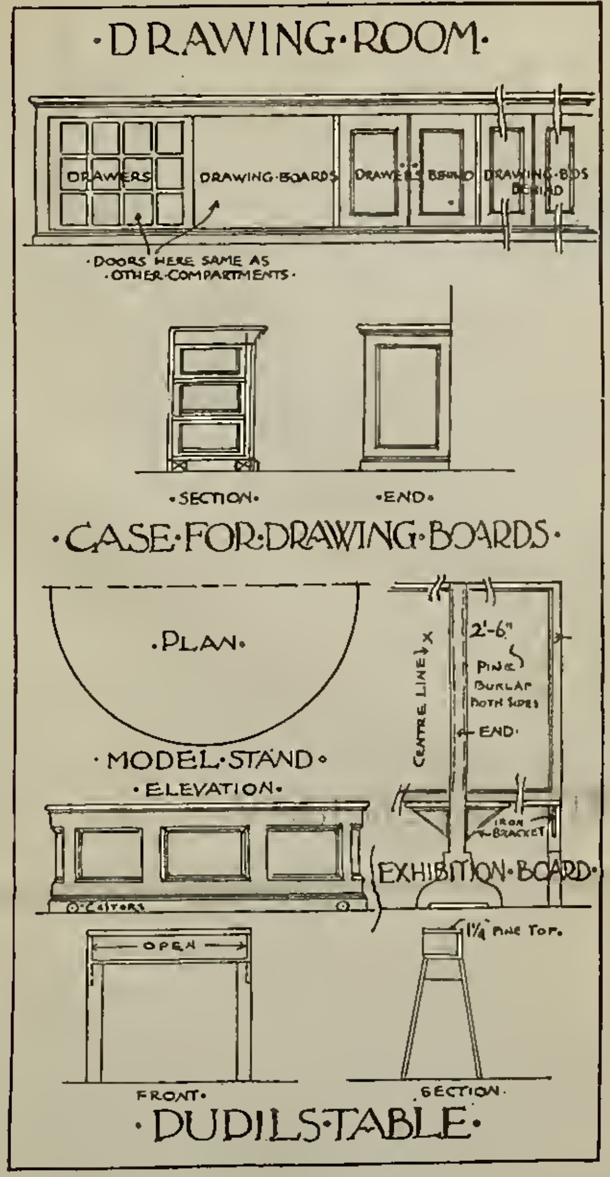

DEMONSTRATION TABLE LECTURE ROOM

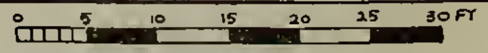

PUPILS TABLE CHEMICAL LABORATORY

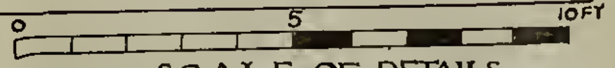

PHYSICAL LABORATORY


BOTANICAL AND ZOOLOGICAL LABORATORY
SOUTH EXPOSURE


LECTURE ROOM


DRAWING ROOM
CASE FOR DRAWING BOARDS
PUPILS TABLE


SCALE OF PLANS

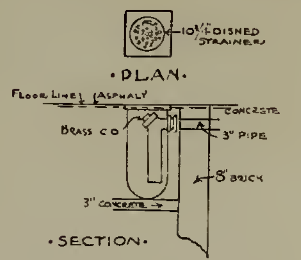

SCALE OF DETAILS

APPENDIX XIII.

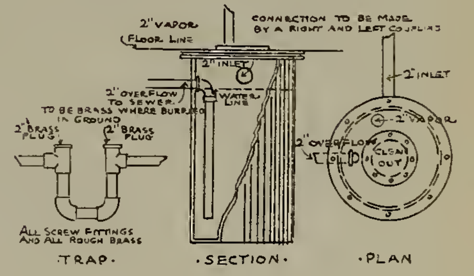
PLUMBING STANDARDS

CITY OF BOSTON
SCHOOLHOUSE DEPARTMENT

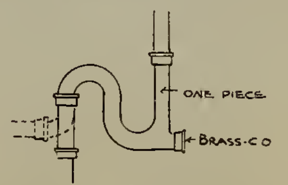
FLOOR WASH



BLOW OFF TANK

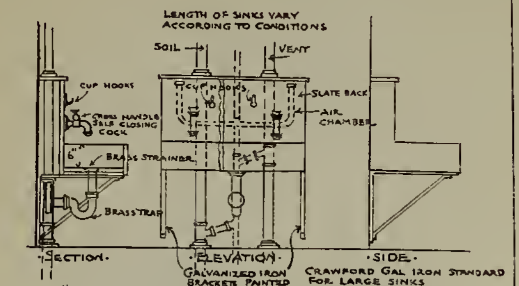


CONDUCTOR TRAP



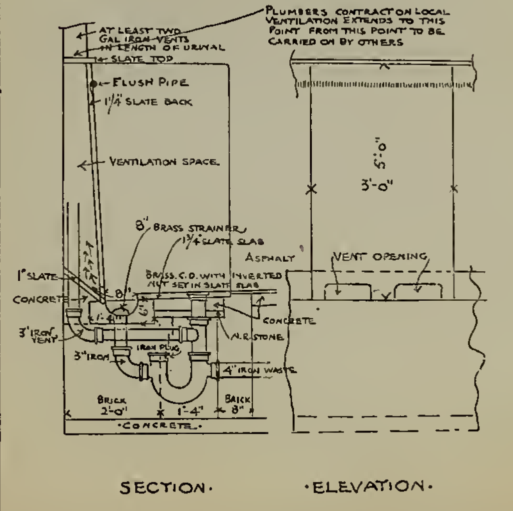
NO TRAP REQUIRED WHERE SEPARATE CONNECTION TO SURFACE DRAINAGE OCCURS.

SLATE SINK

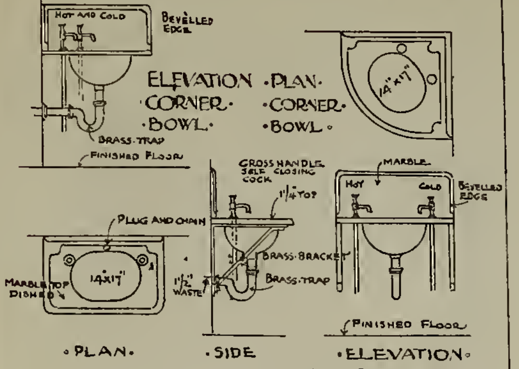

LENGTH OF SINKS VARY ACCORDING TO CONDITIONS
SOIL
VENT
CUP HOOKS
CUP HOOKS
SLATE BACK
AIR CHAMBER
CROSS HANDLE SELF CLOSING COCK
6"
BRASS STRAINER
BRASS TRAP
SECTION
ELEVATION
SIDE
GALVANIZED IRON BRACKET PAINTED
CRAWFORD GAL IRON STANDARD FOR LARGE SINKS

NOTE BRACKETS TO BE PLACED 3'-5" ON SINKS IN BASEMENT SIZE OF SINKS IN BASEMENT TO BE OBTAINED FROM SCHEDULE IN SPECIFICATIONS.

SLATE URINAL

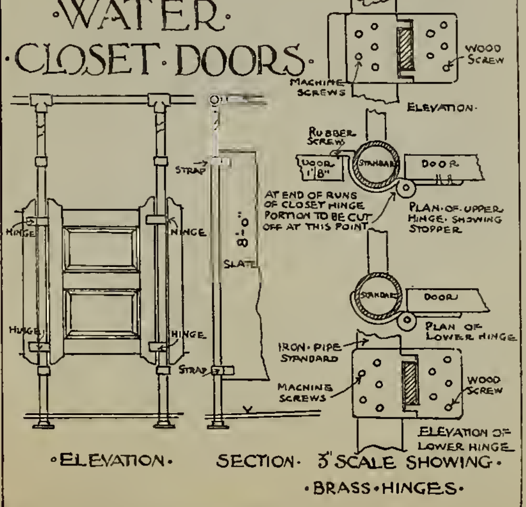


LAVATORY BOWLS

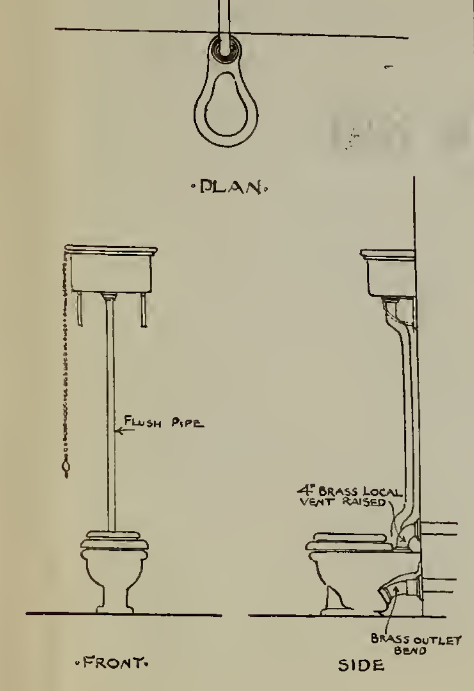


HINGES

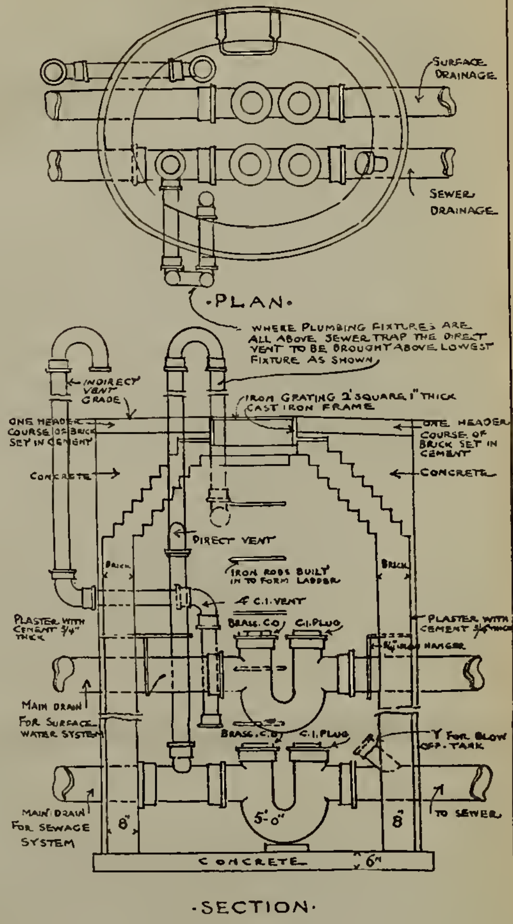
WATER CLOSET DOORS



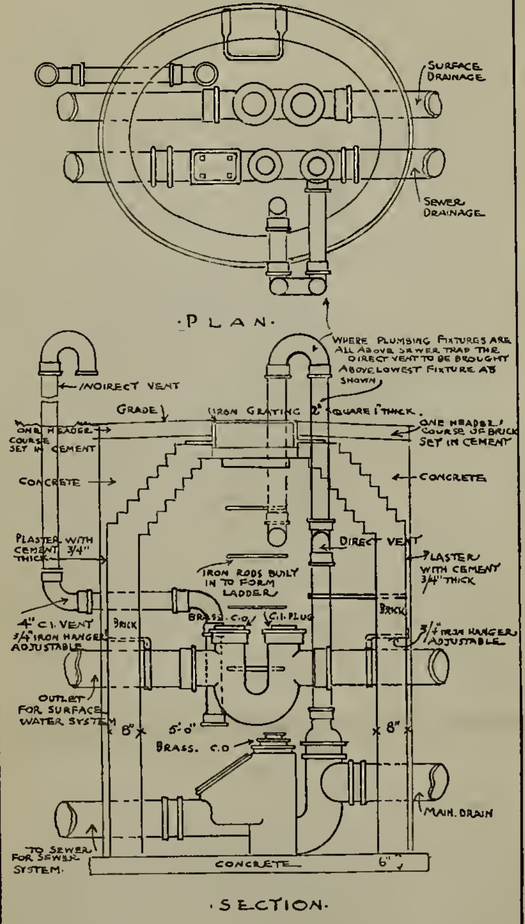
TEACHERS CLOSET



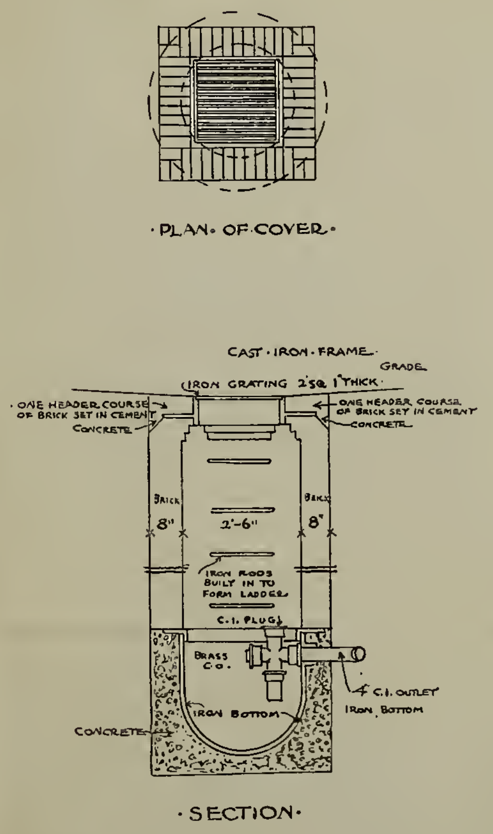
RUNNING TRAP


SURFACE DRAINAGE
SEWER DRAINAGE
PLAN
WHERE PLUMBING FIXTURES ARE ALL ABOVE SEWER TRAP THE DIRECT VENT TO BE BROUGHT ABOVE LOWEST FIXTURE AS SHOWN
INDIRECT VENT
GRADE
IRON GRATING 2' SQUARE 1" THICK CAST IRON FRAME
ONE HEADER COURSE OF BRICK SET IN CEMENT
ONE HEADER COURSE OF BRICK SET IN CEMENT
CONCRETE
CONCRETE
DIRECT VENT
BRICK
BRICK
IRON RODS BUILT IN TO FORM LADDER
4" C.I. VENT
PLASTER WITH CEMENT ¾" THICK
BRASS C.O
C.I. PLUG
PLASTER WITH CEMENT ¾" THICK
¾" IRON HANGER
MAIN DRAIN FOR SURFACE WATER SYSTEM
BRASS C.O
C.I. PLUG
Y FOR BLOW OFF TANK
MAIN DRAIN FOR SEWAGE SYSTEM
8"
5'-0"
8"
TO SEWER
CONCRETE
6"
SECTION

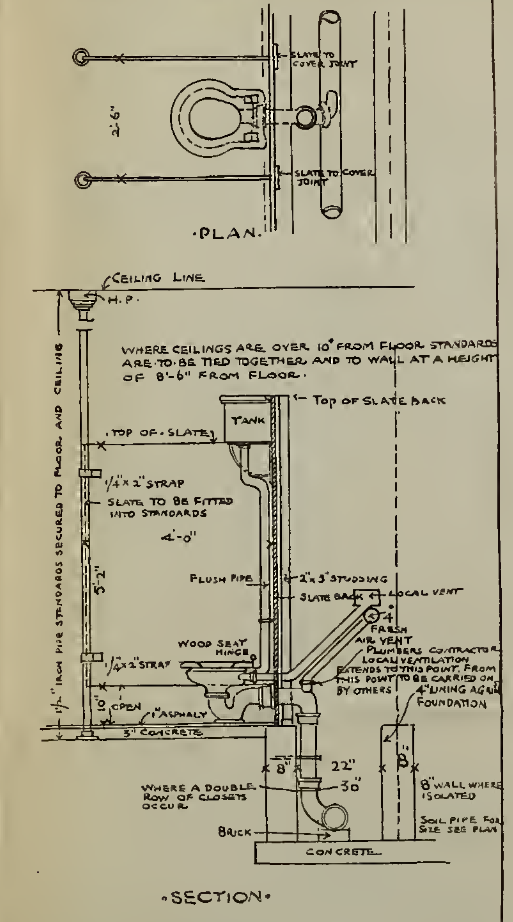
TIDE TRAP

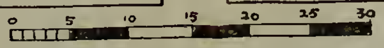

SURFACE DRAINAGE
SEWER DRAINAGE
PLAN
WHERE PLUMBING FIXTURES ARE ALL ABOVE SEWER TRAP THE DIRECT VENT TO BE BROUGHT ABOVE LOWEST FIXTURE AS SHOWN
INDIRECT VENT
GRADE
IRON GRATING 2' SQUARE 1" THICK
ONE HEADER COURSE SET IN CEMENT
ONE HEADER COURSE OF BRICK SET IN CEMENT
CONCRETE
CONCRETE
PLASTER WITH CEMENT ¾" THICK
DIRECT VENT
PLASTER WITH CEMENT ¾" THICK
IRON RODS BUILT IN TO FORM LADDER
BRICK
BRICK
BRASS. C.O.
C.I. PLUG
4" C.I. VENT
¾" IRON HANGER ADJUSTABLE
¾" IRON HANGER ADJUSTABLE
OUTLET FOR SURFACE WATER SYSTEM
8"
5'-0"
8"
BRASS. C.O
MAIN DRAIN
TO SEWER FOR SEWER SYSTEM
CONCRETE
6"
SECTION

CATCH BASIN


PLAN OF COVER
CAST IRON FRAME
GRADE
IRON GRATING 2' SQ 1" THICK
ONE HEADER COURSE OF BRICK SET IN CEMENT
ONE HEADER COURSE OF BRICK SET IN CEMENT
CONCRETE
CONCRETE
BRICK
BRICK
8"
2'-6"
8"
IRON RODS BUILT IN TO FORM LADDER
C.I. PLUG
BRASS C.O.
4" C.I. OUTLET
IRON BOTTOM
IRON BOTTOM
CONCRETE
SECTION

SHORT HOPPER CLOSET


SLATE TO COVER JOINT
2'-6"
SLATE TO COVER JOINT
PLAN
CEILING LINE
H.P.
WHERE CEILINGS ARE OVER 10' FROM FLOOR STANDARDS ARE TO BE TIED TOGETHER AND TO WALL AT A HEIGHT OF 8'-6" FROM FLOOR.
TANK
Top OF SLATE BACK
TOP OF SLATE
¼"x2" STRAP
SLATE TO BE FITTED INTO STANDARDS
4'-0"
1½" IRON PIPE STANDARDS SECURED TO FLOOR AND CEILING
5'-2"
FLUSH PIPE
2"x3" STUDDING
SLATE BACK
LOCAL VENT
4 FRESH AIR VENT
PLUMBERS CONTRACTOR LOCAL VENTILATION EXTENDS TO THIS POINT. FROM THIS POINT TO BE CARRIED ON BY OTHERS
WOOD SEAT HINGE
¼"x2" STRAP
10" OPEN
1" ASPHALT
3" CONCRETE
4" LINING AGAINST FOUNDATION
8"
22"
8"
WHERE A DOUBLE ROW OF CLOSETS OCCUR
30"
8" WALL WHERE ISOLATED
BRICK
SOIL PIPE FOR SIZE SEE PLAN
CONCRETE
SECTION



SCALE OF PLANS

CHOOL BUILDI

1886.	
1887.	12,112
1847.	31,500
1862	9,510
	38,732
1874	
1906.	14,147
1874	Howard Ave. Lot.
1898.	17,500
	Noble Lot.
1868.	
	12,075
	1,661

DESCRIPTIVE SCHEDULE OF PERMANENT SCHOOL BUILDINGS.

Date of Completion.	Name.	District.	Architect.	Description.	Location of Lot.	Area of Lot.	Cost of Lot.	Area of Building.	Cubic Contents of Building.	Cost of Building.	Cost per Cubic Foot.	Rated No. of Pupils.	Cost per Pupil.
1870	Aaron Davis 12 Rooms P.	Dearborn	Charles A. Cummings	2d Class, 3 Stories	Yeoman st., Rox.	18,900	$11,160 00	5,080		$44,873 02		600	$74 79
1880	Abby W. May 8 " P.	Dillaway	E. M. Wheelwright	3d " 2 "	Thornton st., Rox.	11,052	8,045 86	4,510	194,913	41,000 09	$0.21	300	136 67
1897	Aberdeen 2 " P.	Bennett	Lewis H. Bacon	3d " 1 Story	Chestnut Hill ave., Bri.	25,000	13,750 00	3,500	117,100	19,999 70	0 17	100	199 99
1856	Adams 15 " G.	Adams	Joseph R. Richards	2d " 3 Stories	Belmont sq., E. B.	21,000	9,950 00	5,037				650	
1860	Adams and Chestnut st. 2 Rooms P.	Frothingham	Schoolhouse Agent Department	3d " 1 Story	Adams and Chestnut sts., Chas.	20,322	30,885 78			8,315 00		100	83 15
1861	Adams-street 2 " P.	Gilbert Stuart		3d " 2 Stories	Adams st., Dor.	14,535		1,370				100	
1893	Agassiz 14 " G.	Agassiz	E. M. Wheelwright	2d " 3 "	Brewer st., J. P.	42,244		9,631	641,536	99,184 23	0.15	700	141 69
1895	Albert Palmer 6 " P.	Dearborn	E. M. Wheelwright	2d " 2 "	Eustis st., Rox.	10,165		4,731	212,010	45,390 00	0.21	300	151 30
1896	Andrews 9 Rooms P.	Quincy	E. M. Wheelwright	1st[26] " 3 "	Genesee st.	12,578	47,566 29	4,654		165,601 21	0.25	450	115 79
1870	Appleton-street 12 " P.	Rice Training	Emerson & Fehmer	2d " 3 "	Appleton st., near Dartmouth	18,451	22,463 26	5,660				700	
1892	Asa Gray 8 " P.	Hyde	Geo. A. Clough	2d " 2 "	Weston st., Rox.	14,973		5,300	211,504	38,069 98	0 18	400	95 17
1872	Atherton 8 " P.	Christopher Gibson	Bryant & Rogers	2d " 2 "	Columbia rd., Dor.	24,731	11,229 15	5,810		48,022 50		400	120 06
1856	Auburn 4 Rooms P.	Thomas Gardner		3d " 2 "	School st., Bri.	17,340		1,450				200	
1849	Austin 6 " P.	Lyman	Gridley J. F. Bryant	2d " 3 "	Paris st., E. B.	4,619	2,942 00	1,633				300	
1880	Bailey-street 4 " P.	Henry L. Pierce		3d " 2 "	Bailey st., Dor.	21,538	2,712 73	2,176		30,255 61		200	151 28
1854	Baldwin 6 " P.	Washington		2d " 3 "	Chardon ct.	6,183	12,278 00	2,274		13,488 00		300	44 96
1846	Bartlett-street 6 Rooms P.	Dillaway		2d " 3 "	Bartlett st., Rox.	7,027		2,280				300	
1892	B. F. Tweed 6 " P.	Bunker Hill	E. M. Wheelwright	2d " 2 "	Cambridge st., Chas.	16,727	14,248 30	4,300	151,776	39,061 65	0.22	300	130 20
1897	Benjamin Cushing 8 " P.	Mather	A. Warren Gould	2d " 2 "	Robinson st., Dor.	25,032	19,000 00	6,467	337,067	60,425 34	0.18	400	151 06
1890	Benjamin Dean 8 " P.	Thomas N. Hart	Wm. H. Besarick	2d " 2 "	H st., S. B.	11,477	Incl. in Dean & Hart Lot.	3,500	230,451	42,987 29	0.18	400	107 47
1903	Benjamin Pope 8 Rooms P.	Gaston	C. J. Bateman	2d " 2 "	O st., S. B.	20,000	20,000 00	5,370	233,336	45,307 37	0.19	400	113 27
1874	Bennett 7 " G.	Bennett	J. Foster Ober	2d " 3 "	Chestnut Hill ave., Bri.	26,645	12,824 50	5,506		74,310 84		350	212 31
1886	Bennett Branch 6 " G.	Bennett	Geo. A. Clough	2d " 2 "	Dighton st., Bri.	9,600	4,816 70	3,988				300	
1901	Bigelow 19 " G.	Bigelow	C. J. Bateman	2d " 3 "	West Fourth st., S. B.	20,704	45,405 21	13,375	824,516	179,559 54	0.22	950	189 01
1892	Blackinton 9 Rooms P.	Blackinton	E. M. Wheelwright	2d " 2 "	Leyden st., Orient Heights, E. B.	23,166		6,964	291,341	56,037 11	0.20	450	124 50
1893	Bowditch[4] 15 " G.	Bowditch	H. H. Atwood	2d " 3 Stories	Green st., J. P.	23,635		9,303	618,224	104,879 01	0.17	750	139 84
1896	Bowdoin 16 " G.	Bowdoin	E. M. Wheelwright	2d " 3 "	Myrtle st.	10,777	38,120 84	8,183	616,160	109,187 01	0.18	800	136 48
1868	Brewster 4 " P.	Roger Wolcott	E. M. Wheelwright	3d " 2 "	Morton st., Mat.	24,855	Exchange with St. Dept.	3,042		26,100 48	0.18	200	130 50
1899	Brewster Annex 2 Rooms P.	Roger Wolcott	Schoolhouse Agent Department	3d " 1 Story	Morton st., Mat.	Brewster Lot.		2,173		3,099 07		100	31 00
1895	Brighton High		E. M. Wheelwright	2d " 3 Stories	Cambridge st., Bri.	41,871	$17,000 00	11,685		155,887 98	0.10		
1843	Brimmer 14 Rooms G.	Brimmer		2d " 3 "	Common st.	11,401	21,200 00	3,434				700	
1866	Bunker Hill 14 " G.	Bunker Hill		2d " 4 "	Baldwin st., Chas.	19,059		6,550				700	
1843	Bunker Hill 8 Rooms P.	Bunker Hill		2d " 2 "	Bunker Hill st., Chas.	Bunker Hill Lot.		2,958				400	
1864	Canterbury-street 2 " P.	Charles Sumner		3d " 2 "	Canterbury st., W. R.	20,121		1,344				100	
1871	Capen 6 " P.	Thomas N. Hart	Cummings & Sears	2d " 3 "	Sixth st., S. B.	12,334	6,145 31	3,301		34,316 35		300	115 72
1901	Chapman 17 " G.	Chapman	Greeley & Cobb	2d " 3 "	Eutaw st., E. B.	29,150	22,400 00	12,131		130,944 65	0.18	850	154 05
1891	Charles C. Perkins 10 Rooms P.	Prince	H. H. Atwood	2d " 3 "	St. Botolph st.	16,000	38,358 45	7,720	332,640	76,500 00	0.23	500	153 00
1877	Charles Sumner 10 " G.	Charles Sumner	G. A. Clough	2d " 3 "	Ashland st., Ros.	30,901	6,000 00	6,142	457,632	50,232 35	0.11	500	100 46
1872	Chestnut-avenue 2 " P.	Bowditch		3d " 2 "	Chestnut ave., J. P.	13,733		1,465				100	
1894	Choate Burnham 9 " P.	Lincoln	E. M. Wheelwright	2d " 2 "	East Third st., S. B.	17,138	6,277 40	5,356		60,887 10	0.20	450	135 30
1904	Christopher Columbus 24 Rooms P.	Eliot	Winslow & Bigelow	1st " 3 "	Tileston st.	12,934		11,421	727,069	175,586 35	0.24	1,200	146 32
1895	Christopher Gibson 14 " G.	Christopher Gibson	E. M. Wheelwright	2d " 2 "	Bowdoin ave., Dor.	30,020		14,208	784,907	111,029 53	0.14	700	158 61
1871	Clinch 6 " P.	Shurtleff	Bryant & Rogers	2d " 3 "	F st., S. B.	13,122	4,500 00	2,070		33,638 50		300	112 12
1856	Comins 13 " G.	Comins	Richards & Park	2d " 4 "	Tremont st., Rox.	22,183		4,665				650	
1857	Common-street 6 Rooms P.	Harvard		2d " 3 "	Common st., Chas.	7,001		1,879				300	
1852	Cook 6 " P.	Franklin		2d " 3 "	Groton st.	10,170	10,412 50	1,752				300	
1891	Copley 8 " P.	Warren	James Mulcahy	2d " 2 "	Bartlett st., Chas.	18,115	23,609 13	6,115		64,776 96	0.22	400	161 94
1859	Cottage-place 4 " K.	Comins		3d " 2 "	Cottage pl., Rox.	7,094		2,006				200	
1894	Cudworth 11 Rooms P.	Lyman	E. M. Wheelwright	2d " 2 "	Gore st., E. B.	23,000	28,714 14	8,360	418,416	71,185 31	0.17	550	129 43
1867	Cushman 16 " P.	Hancock	Gridley J. F. Bryant	2d " 4 "	Parmenter st.	Hancock Lot.		5,150		57,723 27		800	72 15
1893	Cyrus Alger 8 " P.	Norcross	Geo. A. Clough	2d " 2 "	Seventh st., S. B.	16,560	7,053 00	3,600	344,160	48,472 03	0.20	400	121 18
1905	Dearborn[14] 21 " G.	Dearborn	Edwin J. Lewis	1st " 3 "	Ambrose st., Rox.	30,926		15,592	860,100			1,050	
1859	Dillaway 12 Rooms G.	Dillaway	Geo. A. Clough	2d " 3 "	Kenilworth st., Rox.	22,824	34,238 10	8,050	600,169	79,071 16	0.13	600	131 78
1883	Dorchester-avenue 1 " P.	Mary Hemenway		3d " 2 "	Dorchester ave., Dor.	34,400		7,650				50	
1901	Dorchester High		Hartwell, Richardson & Driver	1st[26] " 3 "	Talbot ave., Dor.	77,550	76,690 00	23,857	1,822,632	321,214 13	0.17		
1859	Drake 6 Rooms P.	Norcross	Bryant & Rogers	2d " 3 "	C st., S. B.	10,260	6,000 00	2,682		33,572 94		300	111 91
1874	Dudley 14 Rooms G.	Dudley	L. Weissbein	2d " 3 "	Dudley and Putnam sts., Rox.	25,389	8,000 00	12,070		132,480 05		700	189 25
1857	Dwight 14 " G.	Dwight		2d " 4 "	West Springfield st.	19,123	22,025 00	5,531		40,324 95		700	57 63
1901	East Boston High		John Lyman Faxon	1st " 3 "	Marion st., E. B.	27,500	63,180 27	11,477	1,161,318	281,040 57	0.24		
1876	Edward Everett 10 Rooms G.	Edward Everett	Geo. A. Clough	2d " 3 "	Sumner st., Dor.	53,250	Trans. from Dor.	6,090	336,160	42,984 98	0.13	500	85 97
1870	Elbridge Smith 8 Rooms P.	Mary Hemenway	Geo. Ropes, Jr.	2d " 3 "	Centre st., Dor.	52,240		4,660				400	
1888	Eliot 14 " G.	Eliot	Gridley J. F. Bryant	2d " 4 "	North Bennet st.	11,077		5,973				700	
1901	Ellis Mendell 12 " P.	George Putnam	Andrews, Jaques & Rantoul	1st " 2 "	School st., W. R.	35,494	$13,341 49	13,314	517,035	135,552 64	0.24	600	209 25
1861	Emerson 6 " P.	Wells		2d " 3 "	Poplar st.	6,924	7,000 00	2,155				300	
1865	Emerson 16 Rooms G.	Emerson		2d " 3 "	Prescott st., E. B.	39,062	8,000 00	8,610		101,565 76		800	126 96
1880	English High		Geo. A. Clough	2d " 3 "	Montgomery st.	85,580	230,000 00	25,170		[6]431,437 41			
1860	Everett 14 Rooms G.	Everett		2d " 4 "	West Northampton st.	22,409		5,645		55,000 00		700	78 57
1873	Everett 2 " P.	Thomas Gardner	Gridley J. F. Bryant	3d " 2 "	Athol st., Bri.	Thomas Gardner Lot.		1,357				100	
1904	Farragut[25] 14 Rooms P.	Martin	Wheelwright & Haven	1st[26] " 3 "	Kenwood rd., Rox.	37,023	38,450 00	13,312	632,630	154,319 98	0.24	700	220 31
1883	Florence street 6 " P.	Charles Sumner		3d " 2 "	Florence st., Ros.	23,050		3,658				300	
1850	Franklin 14 " G.	Franklin	Joseph R. Richards	2d " 4 "	Waltham st.	16,439		6,490		40,845 67		700	58 35
1899	Francis Parkman[20] 8 " P.	Agassiz	Perkins & Betton	2d " 2 "	Walk Hill st., Forest Hills	50,000	9,000 00	7,013	300,333	72,884 14	0.24	400	182 21
1890	Frederic A. Whitney 8 Rooms P.	Washington Allston	Whitman & Hood	2d " 2 "	Webster ave., Bri.	19,761		7,058	271,900	47,880 49	0.18	400	119 70
1868	Freeman 6 " P.	Eliot	Bryant & Rogers	2d " 3 "	Charter st.	5,547	12,089 07	2,250		28,127 82		300	93 76
1874	Frothingham 10 " G.	Frothingham	Geo. A. Clough	2d " 3 "	Prospect st., Chas.	23,079	44,154 00	9,383	464,053	78,058 89	0.17	500	156 12
1896	Frothingham Annex 2 " P.	Frothingham	Schoolhouse Agent Department	3d " 1 Story	Prospect st., Chas.	Frothingham Lot.		2,173		2,995 94		100	29 96
1872	Gaston 14 Rooms G.	Gaston	Geo. A. Clough	2d " 3 Stories	East Fifth st., S. B.	33,334	24,703 70	10,940		104,104 57		700	148 72
1880	George Putnam 10 " G.	George Putnam	Geo. A. Clough	2d " 3 "	Columbus ave., W. R.	31,764	13,102 87	7,229	350,312	66,749 05	0.19	500	133 50
1881	George-street 6 " P.	Hugh O'Brien		2d " 3 "	George st., Rox.	15,824		2,045				300	
1886	Gilbert Stuart 14 " G.	Gilbert Stuart	E. M. Wheelwright	2d " 3 "	Richmond st., Dor.	31,147	13,048 00	9,308	603,600	114,056 59	0.19	700	162 94
1870	Girls' High			2d " 3 "	West Newton st.	37,140	87,212 21	16,530		231,063 36			
1880	Glenway 2 Rooms P.	Oliver Wendell Holmes	Geo. A. Clough	3d " 1 Story	Glenway st., Dor.	Wm. E. Endicott Lot.		2,184		3,168 98		100	31 69
1885	Glenway Annex 2 " P.	Oliver Wendell Holmes	Schoolhouse Agent Department	3d " 1 "	Glenway st., Dor.	Wm. E. Endicott Lot.		2,173		2,933 57		100	29 34
1852	Grant 4 " P.	Phillips		2d " 2 Stories	Phillips st.	3,744	4,071 50	2,021				200	
1847	Hancock 14 Rooms G.	Hancock	Charles Roath	2d " 4 "	Parmenter st.	36,012		6,128				700	
1903	Hancock Annex 2 " P.	Hancock	Schoolhouse Department	3d " 1 Story	Parmenter st.	Hancock Lot.				7,247 29		100	72 47
1883	Harbor View-street 4 " P.	Roger Clap	C. J. Bateman	3d " 2 Stories	Harbor View st., Dor.	27,808	20,000 00	2,825	125,440	15,033 64	0.12	200	75 16
1861	Harris 9 " P.	Mary Hemenway		3d " 3 "	Adams st., Dor.	37,150		5,845				450	
1871	Harvard 16 Rooms G.	Harvard		2d " 3 "	Devens st., Chas.	16,306		6,732				800	
1848	Harvard 4 " P.	Washington Allston		2d " 2 "	North Harvard st., Bri.	20,750		2,400				200	
1860	Harvard Hill[7] 8 " P.	Harvard		2d " 3 "	Harvard st., Chas.	4,645		3,600				400	
1823	Hawes Hall[8] 8 " P.	Bigelow		2d " 2 "	Broadway, S. B.	16,647	123 22	4,608				400	
1857	Heath street 2 Rooms P.	Jefferson		3d " 2 "	Heath st., Rox.	10,669		1,166				100	
1891	Henry L. Pierce 12 " P.	Henry L. Pierce	H. H. Atwood	2d " 2 "	Washington st., Dor.	64,429	13,268 40	14,630	763,380	118,094 03	0.15	600	196 82
1899	Henry Vane 4 " P.	Robert G. Shaw	Bacon & Hill	2d " 2 "	Baker st., W. R.	21,000	2,703 75	3,716	174,008	29,833 23	0.17	200	149 16
1858	Hillside 6 " P.	Bowditch		3d " 3 "	Elm st., J. P.	18,613		3,914				300	
1884	Hobart-street 2 Rooms P.	Bennett	A. H. Vinal	3d " 1 Story	Hobart st., Bri.	10,000	1,300 00	2,615	60,816	6,085 50	0.10	100	60 86
1890	Horace Mann S.		A. H. Vinal	2d " 3 Stories	Newbury st.	6,400	Leased free of rent.	5,100		87,471 42	0.42		
1893	Howard-avenue 6 Rooms P.	Phillips Brooks	Geo. A. Clough	2d " 2 "	Howard ave., Dor.	29,600	$13,049 65	4,244		40,997 17	0.20	300	136 66
1896	Howard-avenue Annex 2 " P.	Phillips Brooks	Schoolhouse Agent Department	3d " 1 Story	Howard ave., Dor.	Howard Ave. Lot.				2,014 23		100	20 14
1897	Hugh O'Brien 14 Rooms G.	Hugh O'Brien	A. H. Vinal	2d " 5 Stories	Dudley and Langdon sts., Rox.	40,654		15,270	759,376	126,348 57	0.16	700	180 50
1896	Hugh O'Brien Annex 2 " P.	Hugh O'Brien	Public Buildings Department	3d " 1 Story	Dudley st., Rox.	Hugh O'Brien Lot.	3,000 00	1,820		2,437 84		100	24 38
1875	Hull 8 " P.	Phillips Brooks	Geo. A. Clough	2d " 2 Stories	Quincy st., Rox.	23,453	9,383 50	5,900	252,400	45,474 56	0.18	400	113 70
1884	Hyde 14 " G.	Hyde	A. H. Vinal	2d " 3 "	Hammond st.	20,734	27,001 50	9,815	550,144	121,601 81	0.22	700	173 80
1901	Ira Allen 6 Rooms P.	Sherwin	Wilson & Webber	2d " 2 "	Parker st., Rox.	20,031			300,478	54,098 45	0.18	300	180 29
1905	James Otis[11] 12 " P.	Lyman	Winslow & Bigelow	1st " 2 "	Paris and Marion sts., E. B.	28,000	31,172 73	8,923	411,645	110,721 73	0.27	600	184 54
1904	Jefferson 19 " G.	Jefferson	Shepley, Rutan & Coolidge	1st " 3 "	Heath st., Rox.	32,215	22,940 83	12,293	850,777	216,455 83	0.25	950	227 85
1876	John A. Andrew 16 " G.	John A. Andrew	Geo. A. Clough	2d " 3 "	Dorchester st., S. B.	24,075	31,225 00	9,755	522,704	68,177 14	0.12	800	85 22
1904	John Boyle O'Reilly 14 Rooms P.	John A. Andrew	Andrews, Jaques & Rantoul	1st " 3 "	Dorchester st., S. B.	34,947		7,112	450,245	115,220 63	0.26	700	164 60
1903	John G. Whittier 10 " P.	Henry L. Pierce	Parker & Thomas	1st " 2 "	Southern ave., Dor.	24,374	9,029 50	7,093	323,051	77,866 00	0.24	500	155 73
1884	Joshua Bates 8 " P.	Dwight	A. H. Vinal	2d " 3 "	Harrison ave.	19,977		5,410	219,068	44,655 75	0.21	400	111 64
1861	Kenilworth-street 8 " P.	Dillaway		2d " 4 "	Kenilworth st., Rox.	9,900		3,400				400	
1856	Lawrence 15 Rooms G.	Lawrence		2d " 4 "	B st., S. B.	14,343	11,904 50	5,478		42,334 10		650	65 13
1898	Lewis 12 " G.	Lewis	Alden Frink	2d " 4 "	Dale st., Rox.	37,850	4,174 35	6,504		64,784 71		600	107 98
1901	Lewis Annex 1 Room M.		Schoolhouse Department	3d " 1 Story	Dale st., Rox.	Lewis Lot.						50	
1859	Lincoln 13 Rooms G.	Lincoln	Gridley J. F. Bryant	2d " 5 Stories	Broadway, S. B.	24,500		5,620		48,270 89		650	74 26
1893	Little Em'ly 1 Room P.	Mary Hemenway	Schoolhouse Agent Department	3d " 1 Story	Adams st., Dor.	Harris Lot.		168				50	
1897	Longfellow 11 Rooms G.	Longfellow	Walker & Kimball	2d " 3 Stories	Hewlett and South sts., Ros.	29,919	14,863 10	8,400		75,423 91	0.17	550	137 13
1874	Lowell 14 " G.	Lowell		2d " 3 "	310 Centre st., J. P.	33,241	20,750 00	10,020				700	
1897	Lowell Annex 2 " G.	Lowell	Schoolhouse Agent Department	3d " 1 Story	Mozart st., J. P.	Lowell Lot.		1,900				100	
1884	Lucretia Crocker 8 Rooms P.	Lowell	A. H. Vinal	2d " 2 Stories	Parker st., J. P.	50,000		5,405	229,824	53,060 22	0.23	400	132 65
1892	Lyceum Hall[12] 7 " G.	Mather	E. M. Wheelwright	3d " 2 "	Meeting House Hill, Dor.	21,319	10,550 67	5,118		20,914 03		350	59 76
1870	Lyman 15 " G.	Lyman	Bryant & Rogers	2d " 3 "	Paris and Gove sts., E. B.	26,250	13,500 00	10,626		114,173 00		750	152 50
1892	Margaret Fuller 6 " P.	Bowditch	E. M. Wheelwright	2d " 2 "	Glen rd., J. P.	14,252	8,539 70	4,450	182,784	39,533 54	0.22	300	133 11
1903	Marshall[13] 15 Rooms P.	Oliver Wendell Holmes	Maginnis, Walsh & Sullivan	1st[26] " 3 "	Westville st., Dor.	30,370	9,482 75	13,314	516,024	127,739 41	0.25	750	170 32
1885	Martin 14 " G.	Martin	A. H. Vinal	2d " 3 "	Huntington ave., Rox.	29,307	21,238 93	8,358	501,760	105,351 65	0.21	700	150 79
1897	Mary Hemenway 12 " G.	Mary Hemenway	T. M. Clark	2d " 3 "	Adams st., Dor.	30,000	9,000 00	8,915	640,106	122,191 31	0.19	600	203 65
1905	Mather 30 " G.	Mather	Cram, Goodhue & Ferguson	1st " 3 "	Meeting House Hill, Dor.	123,050		20,621	1,353,833	266,055 13	0.23	1,500	177 37
1895	Mayflower[2] 1 Room P.	William E. Russell	Schoolhouse Agent Department	3d " 1 Story	Harbor View st., Dor.	Harbor View St. Lot.		604		2,326 56		50	
1897	Mayhew 14 Rooms P.	Wells	John Lyman Faxon	2d " 3 Stories	Chambers st.	14,123	133,263 43	7,029	517,534	107,107 80	0.21	700	153 14
1847	Mead-street 4 " P.	Warren		2d " 2 "	Mead st., Chas.	5,457		1,734				200	
1900	Mechanic Arts High		E. M. Wheelwright	3d[27] " 3 "	Belvidere st.	37,592		14,300		[10]102,412 00			
1896	Medford-street 4 Rooms P.	Prescott	Geo. A. Clough	3d " 2 "	Medford st., Chas.	12,112		2,509	101,256	12,972 44	0.13	200	64 86
1887	Minot 7 " G.	Minot	A. H. Vinal	2d " 3 "	Neponset ave., Neponset	31,500	8,009 85	5,015	277,200	63,857 85	0.23	350	182 45
1847	Mt. Pleasant-avenue[11] 2 " P.	Dearborn		3d " 2 "	Mt. Pleasant ave., Rox.	9,510		1,030				100	
1862	Mt. Vernon-street 3 " P.	Robert G. Shaw		3d " 3 "	Mt. Vernon st., W. R.	38,732		2,630				150	
1874	Miles Standish 8 Rooms P.	Dudley	Geo. A. Clough	2d " 3 "	Roxbury and King sts., Rox.	14,147	29,800 00	5,810	180,916	42,949 08	0.23	400	107 37
1906	Nathaniel Hawthorne 9 " P.	Phillips Brooks	Wm. J. McGinty	1st " 2 "	Harlow st., Dor.	Howard Ave. Lot.		4,621	281,303	70,831 73	0.25	450	157 38
1874	Noble 8 " P.	Emerson	Geo. Ropes, Jr.	2d " 2 "	Princeton st., E. B.	17,500	8,047 00	4,000		48,598 06		400	121 50
1896	Noble Annex 2 " P.	Emerson	Schoolhouse Agent Department	3d " 1 Story	Princeton st., E. B.	Noble Lot.		3,100		2,999 77		100	30 00
1868	Norcross 14 Rooms G.	Norcross	Geo. Ropes, Jr.	2d " 4 Stories	D st., S. B.	14,075	4,969 80	6,923		73,717 29		700	105 31
1855	North Margin-street 2 " K.	Hancock		2d " 2 "	North Margin st.	1,661	825 00	781				100	
1894	Oak-square 2 " P.	Bennett	E. M. Wheelwright	3d " 1 Story	Nonantum st., Bri.	17,066	6,015 48	3,005		20,000 00	0.19	100	200 00
1849	Old Agassiz 6 " P.	Agassiz		2d " 3 Stories	Burroughs st., J. P.	Agassiz Lot.		3,250				300	
1853	Old Baker-street 1 Room P.	Robert G. Shaw		3d " 1 Story	Baker st., W. R.	10,404		1,008				50	
1852	Old Dearborn 14 Rooms G.	Dearborn		2d " 4 Stories	Dearborn pl., Rox.	Dearborn Lot.		7,181				700	
1846	Old East Boston High 6 " P.	Lyman		2d " 3 "	Meridian st., E. B.	12,616	5 00	6,024				300	
1855	Old Edward Everett 6 " P.	Edward Everett		3d " 3 "	Sumner st., Dor.	Ed. Everett Lot.		3,772				300	
1857	Old Gibson 7 Rooms P.	Oliver Wendell Holmes		3d " 2 "	Athelwold st., Dor.	O. W. Holmes Lot.		3,947				350	
1851	Old Ira Allen[22]			2d " 2 "	Leon st., Rox.	10,057		1,105		4,047 20	0.10		
1852	Old Mather 10 Rooms P.	Mather	Emerson & Fehmer	2d " 3 "	Meeting House Hill, Dor.	Mather Lot.		6,123		63,428 45		500	126 92
1845	Old Parkman[22]			2d " 3 "	Silver st., S. B.	5,300	1,150 00	2,080					
1904	Oliver Hazard Perry 14 Rooms G.	Oliver Hazard Perry	Clough & Wardner	1st " 3 "	East Seventh st., S. B.	15,000		9,743	612,351	149,131 20	0.24	700	213 04
1903	Oliver Wendell Holmes 24 " G.	Oliver Wendell Holmes	A. W. Longfellow	1st " 3 "	School st., Dor.	56,348		10,163	991,609	201,643 31	0.20	1,200	168 04
1842	Parkman 12 " P.	Lawrence		2d " 3 "	Broadway, S. B.	10,760	5,630 00	3,676				600	
1904	Paul Jones[23] 10 " P.	Blackinton	Whitman & Hood	1st " 2 "	Horace st., E. B.	17,500	12,050 00	10,234	510,396	117,152 41	0.23	700	167 36
1899	Paul Revere 18 Rooms P.	Hancock	Peabody & Stearns	1st " 5 "	Prince st.	15,986	240,333 22	11,573	707,174	157,253 58	0.22	900	174 70
1862	Phillips 14 " G.	Phillips	Nath'l J. Bradlee	2d " 4 "	Phillips st.	11,190	31,310 00	5,920				700	
1900	Phillips Brooks 15 " G.	Phillips Brooks	A. Warren Gould	2d " 3 "	Quincy and Perth sts., Dor.	32,309	16,850 26	10,324	722,202	114,050 17	0.16	750	152 07
1867	Phillips-street 8 " P.	Comins		2d " 2 "	Phillips st., Rox.	29,355		4,008				400	
1893	Phineas Bates 4 Rooms P.	Longfellow	G. A. Avery	3d " 2 "	Beech st., Ros.	87,500	5,500 00	3,293	160,725	28,373 32	0.15	200	141 86
1880	Pierpont 1 Room M.		Gridley J. F. Bryant	2d " 2 "	Hudson st.	4,246		3,140				50	
1891	Plummer 13 Rooms P.	Adams	H. H. Atwood	2d " 2 "	Belmont st., E. B.	35,073	20,318 37	8,004	321,410	[17]81,012 09	0.21	650	125 02
1876	Polk-street 6 " P.	Prescott	Geo. A. Clough	2d " 2 "	Polk st., Chas.	17,143		4,231	208,902	29,712 92	0.14	300	99 04
1855	Pormort 5 Rooms P.	Eliot	Nath'l J. Bradlee	3d " 4 "	Snelling pl.	4,373	5,614 83	2,116		13,540 86		300	45 14
1857	Prescott 10 " G.	Prescott		3d " 3 "	Elm st., Chas.	16,269		5,166				500	
1899	Prescott Annex 1 Room M.	Prescott	Schoolhouse Agent Department	3d " 1 Story	Elm st., Chas.	Prescott Lot.		1,245				50	
1875	Prince 12 Rooms G.	Prince	Geo. A. Clough	2d " 3 Stories	Newbury st.	32,900	60,000 00	10,030	475,113	83,659 62	0.15	600	139 43
1880	Public Latin[12]		Geo. A. Clough	2d " 3 "	Warren ave.	English High Lot.		25,150					
1847	Quincy 14 Rooms G.	Quincy		2d " 4 "	Tyler st.	12,118	8,151 83	6,456				700	
1882	Quincy street 2 " P.	Mather	Geo. A. Clough	3d " 1 Story	Quincy st., Dor.	16,123	7,000 00	2,030	49,729	4,971 73	0.10	100	49 72
1863	Rice Training 14 " G.	Rice Training	Emerson & Fehmer	2d " 3 Stories	Dartmouth st.	27,125		10,080				700	
1892	Robert G. Shaw 8 Rooms G.	Robert G. Shaw	E. M. Wheelwright	2d " 2 "	Hastings st., W. R.	40,000	10,100 80	7,053	318,640	58,240 60	0.18	400	145 62
1896	Roger Clap 10 " P.	William E. Russell	Wm. H. Besarick	2d " 3 "	Harvest st., Dor.	21,545	9,477 50	7,450	465,050	67,180 70	0.14	500	134 36
1901	Roger Wolcott 15 " G.	Roger Wolcott	Everett & Mead	2d " 3 "	Morton and Norfolk sts., Mat.	39,764	13,500 00	10,853	741,174	137,481 60	0.18	750	183 31
1891	Roxbury High		A. H. Vinal	2d " 3 "	Warren st., Rox.	31,679	40,097 63	17,650		305,250 83	0.26		
1851	Rutland street 6 Rooms P.	Dwight		2d " 3 "	Rutland st.	7,420		2,440				300	
1874	Samuel G. Howe 8 " P.	Lawrence	Geo. A. Clough	2d " 2 "	Fifth st., S. B.	14,491	21,555 75	6,220	221,280	42,508 84	0.19	400	106 27
1905	Samuel W. Mason[15] 14 " P.	Hugh O'Brien	John A. Fox	1st " 3 "	Norfolk ave., Rox.	56,006	17,634 21	6,787	458,223	123,167 76	0.25	700	175 95
1903	Sarah J. Baker 24 " P.	Lewis	Schweinfurth & Craig	1st " 3 "	Perrin st., Rox.	34,454	23,450 47	11,215	702,384	164,922 66	0.23	1,200	137 43
1884	Savin Hill[14] 4 Rooms P.	Edward Everett	A. H. Vinal	3d " 2 "	Savin Hill ave., Dor.	20,080	6,018 10	2,650	95,018	12,753 29	0.13	200	63 77
	School street 2 " P.	George Putnam		3d " 1 Story	School st., W. R.	20,200	Geo. Putnam Lot.	2,145				100	
1824	Sharp 9 " P.	Bowdoin		2d " 3 Stories	Anderson st.	5,687		3,169				450	
1870	Sherwin 16 " G.	Sherwin	Emerson & Fehmer	2d " 3 "	Madison sq., Rox.	32,040	$22,428 10	10,550		103,906 55		800	129 88
1869	Shurtleff 14 Rooms G.	Shurtleff	Bryant & Rogers	2d " 3 "	Dorchester st., S. B.	40,553		9,887				700	
1849	Simonds 3 " P.	Bigelow		2d " 3 "	Broadway, S. B.	Hawes Hall Lot.		834				150	
1870	Skinner 6 " P.	Brimmer	Nath'l J. Bradlee	3d " 3 "	Fayette st.	6,234		3,340		26,141 07		300	88 14
1849	Smith street 2 " K.	Comins		3d " 2 "	Smith st., Rox.	6,092		1,031				100	
1824	Somerset-street 6 Rooms P.	Phillips		3d " 3 "	Somerset, corner Allston st.	6,300	24,000 00	2,064				300	
1901	South Boston High[16]		Herbert D. Hale	1st " 3 "	Thomas Park, S. B.	70,646	23,853 86	23,467	1,525,624	343,719 76	0.22		
1895	Stephen M. Weld 6 Rooms P.	Charles Sumner	E. M. Wheelwright	2d " 2 "	Seymour st., Ros.	34,296	3,793 64	4,766	212,016	47,418 02	0.22	300	158 06
1854	Stoughton 8 " P.	Gilbert Stuart		3d " 2 "	River st., Dor.	27,725	1,477 77	4,874				400	
1878	Tappan 8 Rooms P.	Chapman	George Ropes, Jr.	2d " 3 "	Lexington st., E. B.	31,560	5,500 00	4,935		48,508 06		400	121 50
1875	Thetford-avenue[11] 8 " P.	Roger Wolcott	Geo. A. Clough	3d " 2 "	Thetford ave. and Evans st., Dor.	23,573	9,000 00	6,160	112,672	37,066 00		400	94 92
1905	Thomas Gardner 14 " G.	Thomas Gardner	Stickney & Austin	1st " 3 "	Athol and Brentwood sts., Bri.	44,237		14,957	735,573			700	
1889	Thomas N. Hart 13 " G.	Thomas N. Hart	A. H. Vinal	2d " 3 "	East Fifth st., S. B.	26,264	30,600 00	9,715	565,050	130,990 01	0.23	650	201 54
1817	Thornton street 2 Rooms P.	Dillaway		3d " 2 "	Thornton st., Rox.	6,640						100	
1862	Tileston 8 " P.	Roger Wolcott		3d " 3 "	Norfolk st., Mat.	83,640	2,075 00	5,310				400	
1906	Tuckerman 10 " P.	Gaston	Charles K. Cummings	1st " 2 "	Fourth and L sts., S. B.	21,584		7,472	330,171	78,980 01	0 24	500	157 96
1855	Tyler street 6 " P.	Winthrop		2d " 3 "	Tyler st.	3,500	5,850 00	2,310				300	50 03
1869	Wait 8 Rooms P.	Franklin	Gridley J. F. Bryant	2d " 3 "	Shawmut ave.	16,341		4,100				400	
1858	Walnut-street 7 " P.	Minot		3d " 2 "	Walnut st., Neponset	23,750		3,001				350	
1867	Warren 14 " G.	Warren		2d " 4 "	Summer st., Chas.	14,222		5,604				700	
1904	Washington 30 " G.	Washington	Everett & Mead	1st " 4 "	Norman st.	24,869	106,568 50	17,957	1,300,792	332,223 62	0.26	1,500	221 49
1870	Washington Allston 10 Rooms G.	Washington Allston	Geo. A. Clough	3d " 2 "	Cambridge st., Bri.	23,000	9,008 12	8,520	346,761	47,923 71	0.14	500	95 85
1880	Washington Allston Annex 6 " G.	Washington Allston		3d " 2 "	Cambridge st., Bri.	14,477	31,050 00	3,370				[16]264	
1879	Washington-street 2 " P.	Agassiz		3d " 2 "	Washington st., Forest Hills	24,010		1,193				100	
1863	Washington-street 2 " P.	Robert G. Shaw		3d " 2 "	Washington st., Germantown	13,130		1,243				100	
1850	Way-street 3 Rooms P.	Quincy	Gridley J. F. Bryant	2d " 3 "	Way st., near Harrison ave.	2,503		1,425				150	
1868	Wells 12 " G.	Wells	Richards & Park	2d " 4 "	Blossom st.	10,770	8,404 50	6,016				600	
1845	West Concord-street 11 " P.	Everett		2d " 3 "	West Concord st., near Newland st.	10,356		4,524				550	
1867	West Roxbury High[24]			1st " 3 "	Elm st., J. P.	47,901		16,470	1,046,830				
1897	William Bacon 10 Rooms P.	Dudley	James Mulcahy	2d " 4 "	Vernon st., Rox.	17,256		9,190	500,706	80,298 40	0.16	500	160 59
1905	William E. Endicott 10 " P.	Oliver Wendell Holmes	James E. McLaughlin	1st " 2 "	McLellan st., Dor.	38,807		7,163	348,883	83,287 37	0.24	500	166 57
1900	William E. Russell 18 " G.	William E. Russell	James Mulcahy	1st[26] " 2 "	Columbia rd., Dor.	80,075	20,750 00	15,473	894,941	191,808 35	0.21	900	213 12
1895	William H. Kent 6 " P.	Frothingham	E. M. Wheelwright	2d " 2 "	Moulton st., Chas.	15,917		4,860		[21]33,485 44	0.25	300	178 [illegible]
1892	William Wirt Warren 8 Rooms P.	Thomas Gardner	E. M. Wheelwright	2d " 2 "	Waverly st., No. Bri.	27,137	5,200 00	6,050		30,053 00	0.19	400	67 63
1891	Williams 4 " P.	George Putnam	E. M. Wheelwright	2d " 2 "	Homestead st., Rox.	20,145	7,058 89	3,500	154,754	40,242 10	0.26	200	201 21
1885	Winchell 12 " P.	Wells	A. H. Vinal	2d " 2 "	Blossom st.	14,465	17,523 63	8,220	373,632	67,154 44	0.18	600	111 92
1901	Winship 12 " P.	Bennett	Whitman & Hood	2d " 2 "	Dighton st., Bri.	31,328		10,475	523,578	116,789 20	0.22	600	194 65
1853	Winthrop 14 Rooms G.	Winthrop	Gridley J. F. Bryant	2d " 4 "	Tremont st.	14,100	31,501 76	4,933				700	
1857	Winthrop street 4 " P.	Lewis	Richards & Park	2d " 2 "	Winthrop st., Rox.	9,775		2,140				200	
1900	W. L. P. Boardman 8 " P.	Lewis	James Mulcahy	2d " 2 "	Monroe st., Rox.	17,659		5,861	270,075	53,457 00	0.20	400	133 64
1891	Wyman 6 " P.	Lowell	E. M. Wheelwright	2d " 2 "	Wyman st., J. P.	30,414	10,083 51	5,671	200,250	42,471 71	0.21	300	140 57

NOTES.

G.—Grammar. P.—Primary. K.—Kindergarten. M.—Manual Training. S.—Special.

The cost of buildings does not include the architect's commission.

The cost of the buildings erected between 1875 and 1894 taken from City Architect's Report, 1894.

In nearly all of these buildings there were additional charges for carpentry and painting, covering items now included in the contract for building, such as bookcases, fittings of cookery and manual training rooms, telephones, electric fixtures, the painting and tinting of walls, etc.

In counting rooms only class rooms are taken, and pupils are averaged at 50 to a room.

[1] The cost of this building includes cost of repairing adjoining property.

[2] Purchased 1898. The cost of lot includes cost of building.

[3] Grading, 1897-1898, $4,268.51.

[4] Addition built in 1899, Public Buildings Department, Architects.

[5] Grading, 1897-1898-1899, $6,773.08.

[6] This cost includes cost of Public Latin.

[7] Remodeled in 1873.

[8] Remodeled in 1859, Charles A. Cummings, Architect.

[9] Cookery School.

[10] Cost of work-benches and other equipment not included.

[11] Unoccupied.

[12] Cost of land and building included in cost of English High.

[13] Includes 3 kindergarten rooms.

[14] Addition built 1902, Wales & Holt, Architects.

[15] Addition built in 1895, E. M. Wheelwright, Architect.

[16] Each room accommodates 44 pupils.

[17] This cost includes $7,485.43 expended as an extra on increased depth of foundation necessitated by the condition of the site.

[18] Piles driven to support foundation.

[19] Includes Cushman and Hancock Annex.

[20] 4 room addition built in 1904, C. B. Perkins, Architect.

[21] Addition built in 1898, Andrews, Jaques & Rantoul, Architects.

[22] Used as storehouse.

[23] Includes cooking room and manual-training room in basement.

[24] Uncompleted.

[25] 3 rooms added in 1904.

[26] First-class construction except roof.

[27] Mill construction.